THE ZOOLOGIST.

THIRD SERIES.

Vol. I.] APRIL, 1877. [No. 4.

ANCIENT AND EXTINCT BRITISH QUADRUPEDS.*

By A. Leith Adams, M.D., F.R.S.

Any account of the quadrupeds which frequented the British Islands in bygone ages and before historic times would be imperfect without a brief allusion to the physical conditions of the country during the period of their existence. My observations on that head, however, will be confined to the vast epoch which has elapsed since the close of what is known as the glacial period, when Europe was emerging from the white sheet which for unreckoned ages had clad it, from the Pole to the Mediterranean, in ice and snow. The proofs of this curious episode in the history of the earth are as clear as is the existence of glaciers at the present day. It is, moreover, evident, that the cold period came on suddenly, and, as regards the British Islands, at a time when the physical aspect of the country—at least, as regards the main features of the landscape—did not materially differ from what is now observed. The land was then inhabited by quadrupeds, some of which were identical with species now living, although many afterwards became extinct, and did not reappear. This has been named the pre-glacial period, when our climate was perhaps somewhat milder than it is at

---

* This article on a subject of much interest to zoologists, and upon which comparatively little has been written, was originally published in the Natural-History columns of 'The Field,' and appeared in chapters during the months of October, November and December, 1875, and January, 1876. It is now reprinted for the benefit of such of our readers as may not have seen it, and for the convenience of those who, having already perused the scattered chapters as they first appeared, may be glad to see them now collected in the more convenient and portable form of an octavo.—Ed.

BRITISH MUSEUM

present. During the subsequent glacial epoch the whole of the British islands, including portions since submerged, were clothed in an eternal winter mantle, partly snow and partly in the form of glaciers, which moved down from the high to the low lands, carrying with them rocks and *débris* of all kinds to form fresh deposits.

The remains of the animals in question have been preserved chiefly in caves or in river deposits. The limestone caverns, in which they are found, usually present the following appearances:—On the floor there is a bed of calcareous drippings hardened into a substance known as stalagmite. Under the latter may be seen successive layers of clay and stalagmite of various thickness. Sometimes the osseous remains are found on the floor of the rock simply embedded in the stalagmite. The various levels formed by an alternation of cave-earth or clay and drippings may represent various stages in the history of a cave. For instance, on the surface flint tools, fashioned by man, together with bones of the Red Deer and Oxen, may be found; in the second layer may be discovered the remains of herbivorous quadrupeds and of Lions and Elephants, the larger bones showing evident traces of having been gnawed by predaceous animals. Under these conditions, it may be surmised that the cave was originally a den of carnivorous animals, which had dragged in the bones of their prey, until the surface, getting gradually covered over by stalagmitic drippings, became eventually the resort of man. Of course the absence of traces of his presence is no proof that he may not have been contemporary with the lions in the second deposit; at the same time, we are not justified in admitting his presence unless we find the bones of domestic animals, flint tools, or other relics of man mingled in the same stratum. As to the age of these two deposits, they may or may not represent long periods; much depends on the rapidity or otherwise of the influx of the cave-earth, either through rock-fissures or by the aid of streams, which convey large quantities of soil into underground caverns; whilst the extent of dripping of the lime-water from the roof and sides, and its hardening, depend entirely on circumstances; for a cave may get filled to the top in a comparatively short time, or its filling may be the work of ages. In either case some covering of the bones must take place before they have time to decay, as they otherwise would do if left uncovered. It is wonderful how little stalagmite is required to preserve a bone; a mere crust, not the thickness of a shilling, will often suffice to preserve the thigh-bone of an Elephant. It is now generally supposed that many of the rivers of our southern and eastern coasts are but the head-waters of what were once much larger rivers before the severance of the islands from the mainland of Europe. The Thames is thought to have been one of the tributaries of the Rhine; and, as will be noticed in the sequel, it is seldom that oyster-dredging is prosecuted with vigour on the coasts of Norfolk and Suffolk without quantities of bones of extinct quadrupeds being brought to the surface. When the separation in question took place is not altogether clear; that England and Europe were united, however, at the close of the glacial epoch seems pretty certain, else how could such animals as the Elephant and the Lion have reached the British Islands? The probability is that there was a highway at the Straits of Dover, which may have disappeared before the Lions and Elephants died out on British soil.

With the thaw of the glacial period the rivers doubtless became, then and long afterwards, subject to constant inundations, which covered large tracts of country, and formed deposits of sand, loam and clay, in which the animal remains are now found. London, for example, is built on deposits of the ancient Thames; and in many other situations where insignificant streams now exist, the banks are made up of vast beds of *débris* stretching inland, and containing the bones of both extinct and living animals. Again, deep in the brick-earths of the Thames Valley, at Clacton, Ilford, Grays (Essex), and Crayford, remains representing herds of giant Oxen, Deer, Elephants, Rhinoceroses, &c., have been discovered from time to time, indicating that they had probably been drowned and carried down by inundations of the Thames. In the nature of the animal remains there is a general accord with those of river-bottoms and of the caves, thus showing that they were of the same geological period. But in the brick-earths, or lowermost strata of rivers, it sometimes happens that remains of animals are found distinct from any other species found in the upper beds and in the caves; in consequence, it has been surmised that the brick-earths may have been deposited during pre-glacial times, and therefore contain the animals of that epoch. Some idea of the animals which frequented Wales, South and South-Western England, the Thames Valley, Yorkshire, and the South of Ireland may be gathered from the following:—

In several caverns in Glamorganshire remains of man have been found, associated with bones of the Rhinoceros, Spotted Hyæna, Badger, Ermine (or Stoat), Polecat, Wolf, Fox, Otter, Grisly Bear, Brown Bear and Great Cave Bear, Reindeer, Roebuck, Red Deer, Bison, Urus (or Giant Ox), Hippopotamus, Pig, Horse, two species of Elephants, Hare, Rabbit, Water Rat, Cat, Lion, and Great-horned Deer. In the Devonshire caves the same animals, with the addition of the Sabre-toothed Lion and the Lemming. In the brick-earths and deposits of the Thames an exact repetition of the first have been found, with the addition of the Beaver. The celebrated cavern of Kirkdale was a den of Hyænas, where nearly all the animals of the other caves were found, thus showing a very general distribution throughout the country. The only Irish cave or river deposit at all fruitful was the cavern of Shandon, in the county of Waterford, where remains of the Mammoth, Elephant, Horse, Reindeer, Red Deer, Grisly Bear, Wolf, Fox and Hare were found associated. Scotland, not possessing many limestone caverns, and the Highlands being of granitic formations, together possibly with the effects of a rigorous climate during the period when the quadrupeds in question were living in England, may account for the absence of remains of any save the Wolf, Mammoth and Reindeer, although others may remain to be discovered.

I now propose to note a few of the more interesting details which geologists have brought to light concerning the various species of animals which formerly inhabited the British Islands, but which are now either extinct or only exist in a few localities and in greatly diminished numbers.

THE BROWN BEAR is one of the few extinct British beasts which survived up to the historical period, and, although it had disappeared probably for centuries beforehand in England, we have it on excellent authority that it was common on the Scotch Highlands as late as the middle of the eleventh century.* The date of its existence in Ireland is not recorded;† indeed, as will be presently shown, there are doubts if the Brown Bear (*Ursus arctos*) was a native of that island. It was, however, generally distributed over Central and Northern Europe, and it still lingers on the Eastern Alps and in Russia, and is spread over Northern Asia, and probably also the boreal regions of North America. In the colour of the fur, and also in size, in different countries it is subject to considerable variation, so that naturalists considered the individuals from Norway, Syria, the Himalayas, and Siberia as so many distinct species. If the mere external coloration, however, and a few other minor points be disregarded, it will be found that the bony skeletons of all agree in characters which, as compared with other bears, at once place them in the same category with the typical Brown Bear (*U. arctos*). In regard to size, the skulls and bones dug up in the fens, peat-bogs, and superficial deposits in England certainly belonged to large individuals, but not larger than many now inhabiting different parts of Europe and Asia.

---

* Pennant says it was a native of Scotland in 1057.

† No tradition has yet been found with reference to its Irish residence, although the name *math-gamhuin* (calf of the plains) is supposed by many authorities to refer to the Bear. St. Donatus, who died A.D. 840, asserts it was not in the island in his time.—*A. L. A.* [The skulls of Bears referred to by Dr. Ball (Trans. Roy. Irish Acad., 1849) as having been found in Ireland, are now considered to have belonged to the Grisly Bear.—ED.]

Not only does historical evidence, accompanied by the discovery of its bones in peat and alluvium, point to the existence of the Brown Bear in unrecorded times, but we find its bones, associated with those of at all events very much larger species, in the caverns and deep soils of England; moreover, seeing that the remains in either case represent very old individuals, and that the teeth and bones differ in many respects, there is good cause to believe in the former existence in Great Britain of at least two species of Bear.

The Great Bear of the caverns and the Brown Bear were therefore contemporaneous. As to the former, on arranging and comparing exuviæ collected in Great Britain and on the Continent with bones of living species, it has been found that they admit of division into three, or at least two, distinct forms. One agrees with the skeleton of the Grisly Bear, now chiefly found in the Rocky Mountains and western prairies; the other (*Ursus spelœus*) and perhaps a third (*U. priscus*) have no living representatives, and may therefore be considered as having become extinct in Great Britain long before the historical period. But the Grisly Bear, as far as is known, seems to have disappeared likewise about the same time.

The *Ursus priscus* was the giant of all. Although not rare in England, it appears to have been very common in Southern France and in the Pyrenees, judging from the quantities of bones discovered in the caves and soils. It would appear that, irrespective of larger dimensions, this Great Cave Bear was distinct from the Grisly, or else an unusual variation in regard to bulk and certain osteological characters obtained in the Grisly Bear of ancient Britain. Compared individually, the Brown, Grisly and Cave Bears stood in much the same relative height as the Shetland pony, Galloway, and dray horse.

The geographical distribution of these bears over the British Isles, so far as is known, seems to indicate that the largest form was restricted to England, and that the Grisly was also common in Ireland, where no certain remains of the Brown Bear have been yet discovered.

The Cave Bear no doubt was the first to disappear, followed by the Grisly, whilst the Brown Bear survived to within historical times. All were contemporaneous here long after the separation of Great Britain from the Continent, and gradually died off, it may be from failure of food or through human agency. Looking to the habits and food of living species, it is apparent that the Bear would survive the Lion, for the reason that it is not entirely dependent on flesh for its subsistence, but will eat vegetable food—indeed, many species prefer it to animal food; consequently the Lion may have died of starvation in Great Britain when the Deer and other prey became very scarce.* No doubt failure of food has brought about the extinction of many species, and in the case of the British Islands, even supposing man had not appeared on the scene, the severance from the Continent must have initiated a struggle for existence among the larger quadrupeds, of which the fittest only would survive. The great Cave Bear and the Grisly, not to mention the Lion and Hyæna, must have been formidable enemies to the deer and wild oxen; indeed, the probabilities are that none of the former survived long after the separation from the mainland.

That man played a considerable part in exterminating the bear tribe is proved by the arrows, spears, and hatchets of stone which have been discovered in several caverns† either overlying the remains in question or associated with them. But, although man contributed to the extinction of many species, it is probable that these wild beasts enjoyed a long freedom before he appeared on the scene. How the thick hides were pierced by arrow- or spear-points made of stone, and how man with such weapons could have held his own against powerful and ferocious bears and lions, seems a mystery when we think of the ferocity of the degenerate descendants of these animals. It is, moreover, a curious circumstance not easily explained that, whilst the tiger and lion are daily destroying human beings, we find no indications of man among the gnawed bones so plentifully distributed throughout the ancient caverns and dens of the post-glacial epoch. The only explanation would seem to be that the larger carnivorous quadrupeds found ample subsistence among the lower animals during the cave period without preying on the lords of creation.

---

* But the wild deer have outlived the lion, and survive to the present day. The wild ox was more probably the lion's prey.—Ed.

† Amongst others may be mentioned Kent's Cavern; Brixham Cave, Devonshire; Long Cave, near Gower; and Wokey Hole, Cheddar, Somersetshire.—Ed.

THE GLUTTON, now a native of the Arctic Regions of the Old and New Worlds, was contemporary with the Bears, and sought its fortunes on British soil. Its bones have been discovered in caverns and deep soils in England, but the date of its extinction is so far shrouded in obscurity.

THE BADGER is the sole remaining representative of the Bear family which still lingers in our islands. Like the Glutton, it existed with the Bears, but was not so plentiful, if we may judge from the few bones which have hitherto been discovered.

THE ERMINE, POLECAT, BEECH MARTEN and OTTER can be traced back to the days when the large carnivores and elephantine quadrupeds lived in our islands; and it would appear that, in point of size, individuals of the ancient race did not greatly surpass their modern representatives. It seems probable, moreover, that in all cases where quadrupeds, from early epochs, have remained unchanged in point of size, although confined within narrower geographical limits, they have continued to enjoy abundance of their natural food. At the same time it is the fact that several animals, as the Bear and Elephant, present to a greater extent individual variations in size, according to the favourable or inimical conditions under which they have happened to be placed. These are points of great importance to the naturalist, especially when attempting to trace back the history of extinct animals by a comparison of their remains with those of living species.

THE BRITISH LION is no myth. Two species of the genus *Leo* existed in England long after the glacial epoch. In one of these the canine teeth, so conspicuous in dogs and cats, were enormously developed; and their sharpness and curved form has suggested for the animal the name by which it is known, the Sabre-toothed Lion. Strange to say, the only portions of its anatomy hitherto discovered in this country (in Kent's Cavern) have been some of these very teeth; but on the European continent, as well as in the Himalayas, skulls have been found, as well as canine teeth, the latter varying in length from six to eight inches. If we may judge of the proportions of this beast from the size of its teeth, it must indeed have been a monster. It was a contemporary of the extinct bears and larger herbivorous quadrupeds, but could never have been numerous. Indeed, had it been as common as the existing African and Asiatic Lion is in many inhabited parts of these continents at the present day, neither primæval nor savage man could have held his ground against it. The other species of British Lion was both taller and stouter and had broader paws than its modern representative, otherwise the latter would be regarded as a degenerate descendant of the older race.

There is no sufficient reason for believing that such animals as the Lion, Elephant, or Rhinoceros did not frequent cold regions. The short-haired Tiger of Bengal is replaced by a woolly-haired Tiger in northern China; and in the frozen soil of Siberia discoveries of entire carcases of Elephants and Rhinoceroses clad in dense fur coats prove the exception to the general rule with reference to the outer covering of their living representatives. The fossil Lion, like the large fossil Bear and Hyæna, was long considered to be distinct from any living species, but recent discoveries and comparisons have indicated the closest relationship between the living and the dead. Vestiges of the Lion have been discovered in nearly twenty British caverns, as well as in the deposits of rivers; associated in the former case with remains of Bears, Elephants, Rhinoceroses and other herbivorous animals, as well as with Hyænas. In fact, the Lion was one of the earliest sojourners in the land after the glacial period had commenced to decline.

A LEOPARD or PANTHER, apparently not larger than existing species, also roamed over England in company with the preceding.

If its numbers can be at all estimated from the remains which have been discovered in caverns and river deposits, it is clear that this feline animal was not common; the likelihood may have been that it had no chance with its more formidable rivals just mentioned, who monopolised more or less their common prey.

THE LYNX, which is still resident in many parts of the Continent, was also a native of pre-historic England, but hitherto its remains have only been discovered in a single locality.

THE WILD CAT, although now very local in its distribution, still lingers on the scene where its progenitors lived with the Lion, Bear, Wolf, and other carnivorous animals. On comparing the skeleton of the ancient British Wild Cat with that of a recent individual, no difference is observable, for the reason probably that birds and rabbits, its natural prey, have abundantly supplied its necessities; it has, however, been gradually destroyed, or driven back to a few remaining strongholds, by civilized man.

THE HYÆNA, which frequented Great Britain in pre-historic times, and contemporaneously with the extinct bears, was of larger dimensions than any species now living, although it is now generally regarded as the progenitor of the Spotted Hyæna.

THE SPOTTED HYÆNA, as we may call it, was at one time very common in England, but does not seem to have existed either in Ireland or the Highlands of Scotland. A graphic description of one of its numerous dens is given by Dr. Buckland,* who, in referring to the contents of Kirkdale Cave, Yorkshire, likens the floor to a dog-kennel, where gnawed fragments of the bones of Elephants, Rhinoceroses, Bears, Lions, and herbivorous quadrupeds were strewn about among the remains of no less than three hundred Hyænas, the droppings (coprolites) of which were also met with in profusion. This ancient den must have been used by them for a very long period, and, considering that the remains of no less than twenty different species of animals were discovered there, it may be surmised that, at all events, there was a great variety of quadrupeds in the woods and wolds of Yorkshire in those days. Although the Hyæna does not refuse flesh in a fresh state, it prefers a putrid carcase; and its powerful jaws and strong conical teeth, surrounded at the base of the crown by a belt of enamel, are eminently adapted for crunching bones, for which it has a predilection. It is a sneaking and cowardly animal, and on any show of resistance by its intended victim will hesitate and even retire. Remains of the Spotted Hyæna have been found in upwards of thirty different caverns in England, and generally in such abundance, as compared with other bones, as to show that it was plentifully distributed over the low lands and forests of ancient Britain. The reason for its absence from Ireland, as before noticed, is not clear; unless, perhaps, there was no direct highway between the two islands, as there was between England and the European continent. Moreover, it may be that the country was not sufficiently inviting, although large game, such as the Reindeer and the so-called Irish Elk, abounded. At all events, not a trace of the Hyæna has as yet been found in Ireland, and there are no authentic accounts of any such remains from Scotland, which, as far as the northern parts were concerned, was then doubtless more or less clad in snow and ice. Again, the habits of the Spotted Hyæna, as now known, show that it is not a beast of the mountains, but of the plains.

---

* Bridgewater Treatise.

All the quadrupeds which have lingered on in Great Britain to within historical times were evidently sooner exterminated in England than elsewhere. THE WOLF furnishes an instance. It was quite a scourge in various parts of Ireland and Scotland during the seventeenth century, especially in the former country, where a breed of wolf dogs was carefully preserved.* This race of dogs is now also extinct. It resembled the Scotch Deerhound, but the skull was more wolf-like, so that there is now some difficulty in distinguishing the one from the other. Traces of old circular entrenchments, into which cattle, sheep, and goats were driven for protection from wolves, are still met with in abundance in many parts of Ireland, especially in the southern counties. Unlike other extinct British beasts, the Wolf apparently has not deteriorated in size, for the fossil bones which have been discovered are not larger, nor in any way to be distinguished from those of European Wolves of the present day.

---

* The last Wolf killed in Ireland was in county Kerry, in A.D. 1710. It was common in Connaught, according to O'Flaherty, in 1700. In 1641 and 1652 Wolves were very troublesome, and a council order by Cromwell, dated at Kilkenny, prohibits the exportation of wolf dogs.—*A. L. A.*

When Hyænas and Lions roamed over England, the Wolf was apparently the only large carnivore in Ireland. From this circumstance it has been argued that Ireland was detached from Europe before England and Scotland; or, what may have been more likely, that the physical conditions of the former were not suited to the habits of the animal. Indeed, the apparent anomaly might be explained by comparisons with recent species. Thus, the Brown Wolf, although met with along the lowland valleys of the European and the Asiatic Alps, is not found on the high mountains; and on various parts of the Himalayas Bears, Deer, Ibex, &c., may abound on one range and not on the adjoining one, although apparently equally inviting. To the naturalist who traces back the history of animals into the unrecorded past it is important to know the habits and haunts of living species, and especially their general and particular distribution, inasmuch as the finding of fossil remains in abundance in one situation, and the absence of such remains in another, might lead to the belief that the localities represent two different stages in the earth's history. Moreover, many wild animals repel other species from their haunts. It is said that few of the large quadrupeds frequent districts resorted to by the African Elephant, in consequence of his nocturnal habits and the disturbance he creates in his wanderings; and the Ibex and Great-horned Goat of the Himalayas monopolise whole ranges, and maintain the sovereignty against all other ruminants.

The Wolf must have fed sumptuously in Ireland among the herds of Reindeer and the Great-horned Deer which abounded in that country, seeing that it had no rival, such as the Lion, Panther, or Hyæna, to dispute its rights; indeed, naturalists have surmised that the finding of the skeletons of herds of the latter in the mud of ancient lakes in Ireland indicates that the animals had been driven into the mire by packs of Wolves. We can well imagine the enactment of such a scene as the "Race for Life," so artistically pourtrayed in Mr. Joseph Wolf's 'Wild Animals,' on many a tarn of ancient Ireland, before the formation of the peat.

THE ARCTIC FOX has been but lately added to the ancient British fauna, whilst the Common Fox, as one of a few privileged species, has contrived to maintain its footing in the country to the present day.

The Deer tribe was represented in our islands from the glacial period up to recent times by the gigantic animal known as the Irish Elk, which, with the Moose or Elk, and Reindeer, disappeared from this country before the historical epoch, whilst their contemporaries, the Red Deer and Roe, have, through careful protection, survived them.

The Great-horned, or Gigantic Deer, was unquestionably one of the most magnificent quadrupeds that ever trod the face of our planet. A full-grown stag, standing erect, measured from ten feet to twelve feet from the ground to the summit of the antlers, the spread of which covered over ten feet; with such a span, it has often been a matter of wonder how the animal could proceed through the forest, unless, as the Red Deer often does, it constantly dipped the antlers, which in case of pursuit would greatly impede its progress. Hence the supposition is that it fed more in the open, along the bare hill-sides and by the margins of lakes. The first entire skeleton was discovered in the Isle of Man about 1825; subsequently larger and more perfect skeletons were found in Ireland, and, almost without exception, in the shell marl and clay underlying the bogs. We believe we are correct in stating that no remains of the Great-horned Deer have yet been found in the peat, which shows that the animal must have died out before the moss and other water plants commenced to form on the lakes. Notwithstanding the discovery of several thousand heads and bones of this Deer, they afford no indication that man was contemporary with it, and old Irish literature has been ransacked in vain for evidence on this point.

It was, however, contemporary with the Reindeer in England and Ireland, where remains of the two have been found associated, whether through chance or choice; and there is no doubt that the animal was at one time extremely common in the sister isle—so plentiful, indeed, that there are few peat bogs which have not produced exuviæ.

During the summer of 1875 no less than thirty skeletons huddled together were exhumed from underlying clay in the bog of Killegar, among the Dublin mountains, whilst in the same situation (both instances occurring in an area of not a hundred yards by twenty) in 1847 as many as thirty more heads of this Stag were found. However the deer perished—whether by getting mired when crossing the lake, or when feeding along the margin, or on being driven there by wolves—it is clear that entire herds were destroyed at the same time. The above is only one of many such instances. Amongst the heads found at Killegar in 1847 were two with interlocked antlers. Another and similar instance is recorded from a bog near Limerick,* so that it would seem that many deer lost their lives in mortal encounter along the sides of lakes.

The objection to this deer being called an Elk is the obvious dissimilarity in the form of the antler in the true Elk and so-called Irish Elk. The former had neither brow nor bez antler†; for a long time they were confounded, although, when the difference is pointed out, a glance is sufficient to distinguish them. The weight of the heaviest skull and horns of the Elk seldom exceeds 55 ℔s., and the extreme breadth across the latter is about 70 inches; whereas many dried specimens of its Irish congener weigh upwards of 90 ℔s., and give a horizontal measurement of antlers of as much as 120 inches. The great ugly skull and short neck of the Elk, allowing the antlers to be easily thrown back on the withers, contrast with the small handsome head and long serpentine but powerful neck of the Great-horned Deer. The delicately formed limbs of the latter are unlike the large-boned extremities of the former; in fact, the entire aspect of the latter shows a rare combination of great strength and agility, not equalled in any living species of the family. Although no remains of this deer have been found in conjunction with those of other wild denizens of Ireland, excepting the Reindeer, the probability is that, like the latter, it was a contemporary of the Bear, Horse, and Mammoth. Its remains have turned up in about twelve different English caverns, and in various river deposits, associated in several instances with bones of the large Carnivora and other extinct quadrupeds, showing that it had a place in the ancient British fauna at an early period. Nowhere, however, does it seem to have been so plentiful as in Ireland. This has been accounted for, as before observed, by the paucity of carnivorous quadrupeds, and of such blood-thirsty enemies as the Lion, the Hyæna, and the Bear. In all probability the sharp-pointed antlers ably resisted the attacks of the packs of Wolves which doubtless hung on the flanks and rear of the herd to pull down the young and weakly.

---

* Oldham, Journal Geological Society of Ireland, vol. iii., p. 252.

† Several attempts at imposition have been practised in Ireland by importing horns of the Moose, and painting them red to give a semblance of antiquity. The head of the male Gigantic Deer is in great request among dealers, and in a recent instance as much as £25 was given for a skull and horns of by no means a large individual.—*A. L. A.*

A few years ago, under a bog in county Longford, several bones of the Giant Deer were discovered, in which were deep incisions, as if made by man; indeed, had there not been a ready explanation to the contrary, the appearances were almost conclusive in regard to the artificial nature of the indentations, which resembled the clean cuts made by an axe or hunting-knife. On the shaft of a thigh-bone, close beside it, and fitting into the incision, was the sharp, angular side of the shaft of a tibia, or leg-bone, of the same animal. The quaking or constant up-and-down movement of the mud of the bog for ages, under the successive influences of heat and cold, had caused the tibia to cut deeply into the thigh-bone, and so imitate the appearance of a clean incision by some sharp-edged implement. But, although there are no records of the contemporaneous existence of this Deer and man in Ireland, there are caverns, such as Brixham, Kent's Cavern, and Wokey Hole in Somersetshire, where stone implements of man have been found in proximity with its remains. Many of its bones found in Irish bogs contain marrow, and blaze freely when burned. The small value put on them in times past may be gathered from the fact that the intelligence of the Battle of Waterloo was celebrated in a village in county Antrim by a bonfire of the bones of this animal, while its great horns were often used to form garden fences.

The freshness of the remains, allowing for the excellent preserving influence of the marl, would seem to indicate that the decease of the Giant Deer is of more recent date than that of many of its congeners, and yet, so far as Ireland is concerned, man does not seem to have contributed in any way towards its extermination.

The former existence of the Elk or Moose in the forests of ancient Britain has been inferred from several discoveries. On one occasion portions of its remains were found in the cave of Llandebie, in Wales, in proximity with remains of the Brown Bear. It is not probable, however, that the Elk was very plentiful in this country, although still not uncommon in Norway, and generally distributed over Canada; it is evident that no deer could have sojourned for ages in a country without leaving behind them traces of their former existence, not only in their cast antlers, but on account of the fact that they were much more numerous than the Carnivora which prey upon them.

The **Fallow Deer**, a native of Southern Europe, and still met with in several islands of the Mediterranean and elsewhere, has, on the discovery of a single horn in the mud of the Thames at Clacton, been supposed to have inhabited Great Britain in the days of the elephants, bears, and other animals of the post-glacial period.*

The Reindeer was one of the earliest arrivals on British soil after the ice and snow of the glacial epoch began to disappear. It must have been very common in England and Ireland, and perhaps also in Scotland—at all events, after the great glaciers began to recede. Remains of the animal have been discovered in thirty caverns and in as many river deposits throughout England, and in Irish caverns, and in shell marl under Irish bogs and Scottish lakes.† It is still plentifully distributed over the boreal regions of Europe, Asia, and America, but varies considerably in dimensions, and somewhat in the appearance of the antlers, in different countries; indeed, as regards height and weight, there are remarkable peculiarities in different regions. Thus the Reindeer of Lapland is small, as compared with the Siberian and Newfoundland forms; the former stands about three feet five inches, whilst the latter is on an average four feet two inches at the withers, their weights respectively being often 90 lbs. and 300 lbs. There is no evidence to show when the Reindeer disappeared from the British Isles, but it was contemporary with the Lion, Hyæna, and Elephant, and lingered on until the advent of man, whose flint tools have been discovered in the same deposits which contain its bones. The fossil remains, as compared with the bones of recent varieties, such as the Caribou or Great Woodland Reindeer of of Canada and the smaller forms of Northern Europe, approach, in the rounded beam and large brow antler and dimensions of bones, to the Norwegian and Lapland Reindeers, which are probably direct descendants of the old British stock; so that the ancient Reindeer of Great Britain was not relatively so large as many individuals now living. The bones found in English caverns, and that of Shandon, in Ireland,* were fragmentary, and had evidently been dragged there by predaceous animals. There are, however, two splendid heads, almost entire, from the bog marls now in the museum of the Royal Dublin Society, one of which has been already referred to in connection with the discovery of the skulls and bones of the Giant Deer; the other, and more perfect of the two, is from a neighbouring locality among the Dublin mountains.

---

* *Vide suprà* p. 92.

† As many as 1000 antlers are said to have been taken from a rock fissure in South Wales. Falconer, Palæontological Memoirs, vol. ii., p. 510.

As known to us at the present time, the Reindeer is associated with an Arctic climate. It is, however, still not uncommon in North America as far south as New Brunswick, and was even common lately in the forests of New England, latitude 40°. But doubtless the climate of our islands in former days was much colder than at present; indeed, the same may be said of Central Europe, inasmuch as Reindeer remains have been found in the caverns of the South of France.

There are no ruminating animals more given to extensive migration than many varieties of the living Reindeers of North America and Asia, so that their northern and southern limits frequently include many degrees of latitude. They are easily hunted down, and consequently soon exterminated from particular tracts.

THE RED DEER, like the Roebuck, the Mole, and the Water Rat, is one of the few survivors of the extensive list of mammals which inhabited Great Britain during the Pliocene epoch—*i.e.* the epoch which immediately preceded the glacial period. Their pedigrees, therefore, are as ancient as any in the land—at all events, so far as the discovery of fossil relics is concerned; but in all probability neither of the two first-named would have survived but for the protective influence of man.

Remains of the Red Deer are met with in peat and superficial soils; in clay and marl below the latter; in more ancient cavern deposits, associated with relics of nearly all the extinct and several living species, as well as in estuaries and river deposits, said to have been formed before the glacial epoch. The bones and horns of the more ancient individuals are, on an average, larger than our semi-domesticated races. Indeed, the denizens of Great Britain are inferior in size and development of horn to those of Northern and Central Europe; whilst the Red Deer of Siberia and the Himalayas are even larger still, and approach more nearly the largest fossil forms, and to the great Wapiti of Canada: so that, considering the antiquity and wide-spread distribution of the Red Deer, and the varying climates in which it exists, one might almost refer them all to one species, certain varieties of which have become differentiated under the influence of food, climate, and situation. Horns of the Red Deer from the same deposits in Ireland as those of the Gigantic-horned Deer are not so massive as those of the same age from many localities in England and Scotland.

---

* Shandon Cave, near Dungarvan, Co. Waterford, where bones of upwards of fifty individuals have been found associated with those of the Wild Horse, Mammoth, Red Deer, Wolf, Bear, and Fox.—ED.

THE ROEBUCK does not appear to have been a native of Ireland, according to the historian Giraldus Cambrensis, who seems to have been well acquainted with the beasts found in England in his day (1180), and at all events made inquiries in Ireland with reference to the wild animals of that country; but when its condition at that period is considered, the probability is that its fauna was comparatively unknown.

THE MUSK OX, or MUSK SHEEP, as it is variously named, now confined to the Arctic Regions, was once a native of England, as testified by the discovery of its remains in eight or ten different localities, either in caverns or river deposits, associated here and there with remains of the Hairy Mammoth and the Hairy Rhinoceros.

The ancient British oxen were of two species, a Giant Ox and a Bison.

THE PRIMÆVAL or GIANT OX was a noble animal; but both species were gigantic in size, and were doubtless formidable antagonists to even the lions of the period. The Bison seems to have been prevalent in Great Britain during and long after the Roman invasion, whilst, on the other hand, there are evidences to imply that the one under consideration lived in the land before the glacial period.

The Primæval Ox's remains are met with in ancient tumuli, but perhaps it was exterminated before Cæsar's landing.*

---

* Cæsar mentions this animal, "Urus," as plentiful in the Hercynian forests, but does not refer to its presence in Britain.—ED.

In the brick earths of the Thames valley magnificent heads of this noble-looking animal have been discovered from time to time. Even the horn cores in many instances measure three feet, with a breadth of forehead between horns of one foot. Although abundant remains have turned up in England, Wales, and Scotland, there are no authentic data of the animal in connection with Ireland. Whether the semi-feral Chillingham breed belongs or not to this species, it is evident that it is, as regards size, a degenerate race of either of the British fossil oxen. As to the assertion that our domesticated cattle are descended from the Giant Ox, it may be stated that, unless introduced by the Romans, there is a probability that the Long-fronted Ox, which will be noticed presently, may have sprung from the latter, and in the course of ages become through domestication a distinct variety, from which all our modern cattle have been derived; but the foreign wild species are so numerous, that to speculate on domesticated breeds and their progenitors would be a fruitless undertaking. With reference to our islands, and Europe generally, it was believed by Cuvier—and Bell in his 'British Quadrupeds' is of the same opinion—that our domestic cattle are the degenerate descendants of the Wild Ox, whilst Professor Owen is more inclined to think that the Romans were the first to introduce cattle into England. The discovery, however, of remains of the Long-fronted Ox in various parts of the country, associated with stone and bronze implements considered pre-Roman, gives strength to the view that it was reclaimed by the ancient Britons long before the invasion. It seems, however, now impossible to differentiate all the points in connection between the wild and tame oxen, so as to come to just conclusions as to their relationships; indeed, as far as pedigree is concerned, the British human and bovine animal are on a par.

The Bison or Aurochs seems, if anything, to have been more plentiful than the Giant Ox. It was larger than the living Bisons of Europe and America, but the connections between the three are very close, and, when we admit time as a factor, in conjunction with food, region, and climate, it may be fairly allowed that the present denizens of the Lithuanian, Moldavian, Wallachian, and Caucasian forests and North-western America are very closely allied to each other, and to the fossil remains found in Great

Britain and on the Continent.* The finest bulls of the Lithuanian breed stand about five feet six inches at the withers, whilst, according to Richardson, the American Bison is upwards of six feet in height. The fossil British Aurochs, as compared with these, must have frequently reached a height of seven feet at the shoulder. The Grisly Bear is at present one of the most formidable enemies to the American Aurochs, as doubtless was also the case in bygone times on British soil.

THE LONG-FRONTED OF SMALL FOSSIL OX is considered by Prof. Owen to be an ancient and distinct species which sojourned with the other oxen, bears, elephants, and like extinct quadrupeds. It seems to have been very plentiful in Ireland, and survived at all events up to the human, and most likely the historical, period, in which cattle are frequently noticed in old Irish MSS.,† but of course not described with the necessary exactness to enable us to determine the species or breed. In bogs, and the deposits of lakes, especially in those of Loch Gur, its bones and skulls have been found in numbers. Many of the latter show fractured indentations on the forehead. ‡

The antiquity of the Long-fronted Ox has been lately disputed by Professor Boyd Dawkins, who is of opinion that this Ox and the Goat were brought to Great Britain from the Continent by man long after the larger animals had disappeared—some time in the period which intervened between the commencement of the formation of bogs on the ancient Irish lakes, and the first historical evidence of the animals of the country. It is doubtful, however, whether or not we have sufficient evidence as to the exact antiquity of this Short-horned Ox. It would seem that remains have recently been found both in conjunction with the Bison and Giant Ox, Elephant, and Rhinoceros in England, and in lacustrine marls in Ireland, associated with bones of the Great-horned Deer. Looked on in connection with the origin of our cattle, it seems at all events, whether descended from the *Urus* or any other wild species, to have contributed towards the tamed stock; none of these, however, retain its well-marked cranial characteristics, which are conspicuously shown in the lengthened forehead. There are decidedly, however, as far as Ireland is concerned, very many variatious in the curvature of the horns of skulls dug out of peat, which would seem to point to a long course of domestication; at all events, whether the animal was or was not a wild denizen of the land, it was very generally reared and eaten in England and Ireland during the early colonization of the islands.

---

* The American Bison has fifteen pairs of ribs, while the European has fourteen. As regards the Aurochs, no fossil skeleton has been found sufficiently perfect to show the exact number of ribs it possessed.—ED.

† In a curious Irish MS. of the ninth century, wild oxen are spoken of as inhabiting the county of Clare.—*A. L. A.*

‡ Many of these cuts are small, and may have been produced by blows from the narrow bronze hatchets (celts) plentifully discovered throughout the country.—*A. L. A.*

Few facts in the natural history of the British Islands are more surprising than that elephants, rhinoceroses, and a species of hippopotamus once dwelt in our land, when its physical aspect was not materially different from what obtains at the present day. No doubt these and other extinct mammals were more plentiful when Great Britain formed part of the continent of Europe, and when the Thames and other rivers were broader, as testified by their deposits. Still there is evidence to show that they lingered on after Great Britain had become separated from the mainland, a few only surviving the prehistoric period.

The Thames valley in olden times, as shown by the animal remains found in its deposits—*i. e.*, remains of elephants, rhinoceroses, and river-horses, deer, oxen, and so forth—must have presented a wilder aspect than even the banks of the upper Nile at the present day.

Not many years ago, whilst some workmen were employed in deepening a cellar below a club in Charles Street, St. James's, they discovered the grinding tooth of an Elephant, a portion of the back-bone of the Giant Ox, and the curved canine tooth of a Hippopotamus, all in the clay which underlies the gravel so well known to London geologists.

THE GREAT HIPPOPOTAMUS, which inhabited England before the glacial epoch, returned again at its close, along with other quadrupeds. It appears to have been not uncommon, seeing that remains have been found in bone caves in Devonshire, South Wales, Somersetshire, Huntingdonshire, Cambridgeshire, Bedfordshire, Gloucestershire, Middlesex, and Yorkshire, and in the deposits of the rivers Thames, Ouse, Cam, and Avon. There is only one record, and that not well authenticated, of its occurrence in Ireland, a canine tooth having been found near Carrickfergus, and in Scotland no traces have turned up.

In size and character the extinct river-horse of North-western Europe differed in some degree from the present denizen of the Nile, which even in historical times was plentiful in Egypt, where teeth of individuals have been discovered in river alluvium as large as those of many of the Great Hippopotamus. It may be that the former is a degenerate and modified descendant of the latter; and whilst we hesitate to associate in idea the naked hide of the Nile animal of the present day with our colder climate, enough is known of the Hairy Elephant and Rhinoceros, which dwelt here contemporaneously, to warrant the inference that the Hippopotamus may also have had a woolly coat.

Great Britain, or rather the area embraced by the insular group, during that epoch which preceded the glacial period—when, as has been already remarked, the aspect of the country, so far as its plains, rivers, mountains, and valleys were concerned, did not differ materially from what obtains at the present day—was tenanted by two species of elephants, one of which, the Southern Elephant, did not re-appear on the scene after the glacial ice and snow had begun to yield to the coming temperate climate. The other species, named the Ancient Elephant, returned to its old haunts, and the Mammoth Elephant appears now on the scene for the first time. At all events, so far as has been ascertained, there are no indications of the latter having arrived beforehand, as none of its remains have been discovered in deposits anterior to those of the glacial period.

The discovery of an entire Mammoth in the flesh, at the commencement of the present century, in frozen soil at the mouth of the river Lena, and the subsequent removal of the carcase to St. Petersburg, where it now remains, show that, like the Hairy Rhinoceros hereafter mentioned, it was an animal adapted for a cold climate.

THE MAMMOTH at the period under consideration, and up to a late geological date, had an almost world-wide distribution. Its tusks are found in such quantities along the Siberian shores and islands to Behring's Straits, that a thriving trade in ivory has resulted, whilst the fishermen on the coast of Norfolk have dredged up many thousand grinders and tusks of the animal. It has left its remains in North America as far south as Mexico, and in Europe from the frozen seas to Rome. In Great Britain it has been traced throughout England, Wales, and the south of Scotland, and remains have been found in two widely distant localities in Ireland.* In fact, of all the ancient British mammals the Mammoth was evidently one of the most common, and seems to have survived the Elephant next to be mentioned. Of its contemporaneous existence with man in Europe, we have evidence not only in the discovery of stone implements along with its remains, but a few years since a fragment of the tusk of a Mammoth was found in the cave of La Madelaine in the Dordogne, on which was a rude but faithful representation of this hairy Elephant, etched by means of the stone implement of some cave dweller of the period, when, together with the Reindeer and the Bear, it roamed over Southern France.

THE ANCIENT ELEPHANT, as it has been named, was, as far as our islands are concerned, not so gigantic in stature as the Mammoth, and was distinguished by the possession of grinders formed on a very different pattern. Taken in conjunction with other differences in the skeleton, these characters afford as well-marked distinctions between it and the Mammoth as those which exist between the African and Asiatic Elephants. The Ancient Elephant has been more frequently found in middle and southern Europe than in the north-west; nevertheless, from the quantities of teeth and bones found in England, the probability is that it was at one time quite common here. In regard to geographical distribution, the exuviæ hitherto discovered show that it was confined to Europe. The tusks of the Mammoth curved considerably upwards, whilst those of the Ancient Elephant much resembled the tusks of living species, and were nearly straight. In point of size, neither of the fossil species very much exceeded the largest African Elephant, although the bull Mammoth, as a rule, was considerably taller than its living representative.

Admitting points of distinction between these two extinct elephantine animals, we are naturally led to inquire how far they differed from the Asiatic and African Elephants of the present day. It may be stated generally that in its skeleton the Mammoth is closely allied to the Asiatic Elephant; so alike are they, indeed, that, but for the peculiar construction of the grinders and the curling tusks of the Mammoth, it would be difficult to distinguish them. Allowing, therefore, for influences before referred to, we may assume that the naked skin and other differences observable in the Asiatic Elephant may be due to conditions under which the animal had lived for long ages; indeed, there appears to be a growing belief among naturalists that the Mammoth might have been the progenitor of the Elephant of Asia. In the case of the Ancient Elephant there is also an agreement, though less marked, in its teeth and bones with those of the African Elephant; but we must wait for further discoveries in the soils and caverns of Southern Europe and Asia before any more exact relationships between the living and extinct species can be determined.

---

* Cavan and Waterford.

THE RHINOCEROSES that inhabited Britain possessed characters which in the opinion of many naturalists warrant their division into two or three species, all of which carried two horns, like the animals now living in Sumatra and Africa, as distinguished from other species.

THE TICHORHINE TWO-HORNED RHINOCEROS—so named from having a bony septum to its nose—was very plentifully distributed over England after the glacial period. It is the same animal which the Russian naturalist Pallas found frozen and entire, in 1771, in the sands of the river Viloni, in Siberia. The body was clad in long shaggy hair, and the flesh and skin were for the most part preserved, from constantly lying in frozen soil—how long, who is to say? At all events, no native traditions speak of the animal. Its remains (chiefly teeth) have turned up in about sixty different localities in England, and are usually associated, as in Siberia, with remains of the equally hirsute Mammoth. Its nearest living ally is the African or Two-horned Rhinoceros, which stands nearly five feet in height, with a length of eleven feet. To judge by the measurements of the individual discovered by Pallas, the above is a somewhat smaller animal than the extinct Tichorhine species.

Another fossil species (or variety, as some consider it) has been named the LEPTORHINE TWO-HORNED RHINOCEROS, and is distinguished from the last-named by a more slender body, as evidenced by its bones and teeth. The third form, named the MEGARHINE TWO-HORNED RHINOCEROS, is distinguished by the presence of incisive teeth. The second was not nearly so plentiful as the first, whilst the third has only been met with on a few occasions in deep river deposits, thus indicating its existence before the glacial epoch. Altogether, up to the present time remains of rhinoceroses have been discovered in no less than eighty different localities in England, whilst not a trace of the genus has been hitherto met with either in Scotland or in Ireland.

The Wild Hog was an ancient tenant of British soil, and maintained its footing as long as there were forests to give it shelter and its enemy—man—allowed it to exist. It still haunts the least civilized parts of Europe and Asia, and, by its accommodating disposition, can subsist where other herbivorous quadrupeds would perish.

It seems to have been plentiful in Great Britain, and the Boar, as a rule, was larger, and had the canines and molars more highly developed, than is usual with individuals of the species nowadays. Remains have been found associated with those of almost all the large extinct mammals, both in caverns and in river deposits. Its skull, battered in by either stone or metal axe, like those of the Long-fronted Ox, is often met with in the bogs and lake bottoms in Ireland, where large specimens have been found. It ceased to be a wild animal in that country after the beginning of the seventeenth century, but was very common in the twelfth century, according to Giraldus, who remarks:—"In no part of the world have I seen such abundance of boars and forest hogs; they are, however, small and misshapen and wary."*

A Horse about the size of a Galloway seems to have been very common on British soil after the glacial period; indeed, single teeth, found in conjunction with remains of the Mammoth, Hippopotamus, and Rhinoceros, indicate an animal between fourteen and fifteen hands high, but the sizes of the teeth are no certain indication of the height of their owners. No doubt there were both large and small races, but, taking the bones into consideration, it may be safely surmised that the majority were about the dimensions above stated. The skulls indicate what horse dealers would designate a "fiddle head," but the limb bones imply that the owners combined strength with agility. The Horse was a native of Ireland in the days of the Mammoth and Reindeer, with remains of which it has been found in the lately excavated cave of Shandon. The extinction of this animal appears to have taken place long before any record of its existence was made. Some idea of the numbers of this ancient British Horse may be gathered from the fact that its remains have been recognized in no less than fifty different situations in England alone, and in northern, central, and southern Ireland; whilst, strange to say, it has not been identified in any deposits north of the Tweed. In fact, the Mammoth and Reindeer appear to have been the only large mammals which at that time frequented Scotland, where the climate was doubtless inimical to the habits and requirements of other species.

---

* Topographia Hiberniæ.

The Beaver was not uncommon in the rivers of Wales towards the close of the twelfth century, according to the Welsh author Giraldus Cambrensis. It was also, according to historians, a native of Scotland and England in the fifteenth century; but Giraldus asserts that it was not found in his time in Ireland, where up to the present day not a trace of its existence has been discovered. The bones of Beaver, Hare, Red Deer, Roebuck, Ox, Brown Bear, Wolf, and Boar have been dug up in peat-bogs; moreover, it lingered on to historical times, and was finally extirpated by man. A few are still to be found in the more remote and sequestered river-tributaries of Central and Eastern Europe,* and the species still flourishes in Canada, in spite of trappers and the Hudson's Bay Company.

Along with this Beaver there lived in pre-glacial times a gigantic species to which the name of Cuvier's gigantic Beaver has been given. This species, however, did not survive the glacial period, and ought not properly to be included with the quadrupeds now under consideration. The connection, however, between the two shows that the smaller and more recent species survived the intense cold of the glacial epoch, possibly by migrating during its continuance to Southern Europe. The comparison in size between these two Beavers, at one time contemporaneous, coupled with anatomical characters, seems to preclude the possibility of the larger being a more highly developed race of the smaller. Beavers' bones have been dug up in the lower brick-earths of the Thames, and under the streets of London, and there can be no doubt that at one time the Beaver built its dam on this river and its tributaries as well as on many other English, Scotch and Welsh streams and lakes.*

---

* In Lord Clermont's 'Guide to the Quadrupeds of Europe' (1859), it is stated (p. 83) that the Beaver, though in greatly reduced numbers, is still found in several rivers of the northern and central countries of Europe, such as the Danube, Rhine and Rhone, on which last it is recorded by Crespon as occurring from Pont St. Esprit to the sea, especially among willow plantations, on which it sometimes inflicts serious injury. It is rare in Russia, except on the Dwina and Petchora, but according to Pallas, is numerous in Siberia, Tartary and the Caucasus. As regards Siberia, see the first of the "Occasional Notes" in the present number.—Ed.

THE HARE and RABBIT have pedigrees which extend back to the days of the British Elephants, Rhinoceroses, Lions, and other large quadrupeds, nor do they seem to have been of greater size then than their present representatives, although jaws and skulls of hares have been occasionally met with somewhat larger than the same parts of any living species of the genus.

THE PIKAS or TAILLESS HARES of Northern Asia were once distributed over Europe, and several portions of their skeletons have been found in cave-deposits in England, associated with remains of nearly all the large extinct mammals.

THE LEMMING, still plentiful in Northern Europe, and renowned for its voracious habits, had a representative in England in olden times, as proved by the discovery of its remains in several cave-deposits. The Marmots or Ground Squirrels also had a compeer, as shown by the discovery of its relics in the cave of Fisherton, near Salisbury. The WATER RAT seems to have been common, also the LONG- and SHORT-TAILED FIELD MICE and the COMMON HOUSE MOUSE.

THE LARGE HORSESHOE BAT and the NOCTULE or GREAT BAT, both still natives of the British Islands, have left their bones in caves; but, considering that they live in these situations and hide in crevices and holes, it is possible that the bones of recent individuals may get mingled with those of fossil animals. The same may be said of the **MOLE, COMMON SHREW** and **HEDGEHOG**; at the same time there is every probability that these animals were contemporary in many cases with the larger quadrupeds, with whose remains their bones have been found mingled.

---

* Fossil remains of the Beaver have been found in Berkshire (Phil. Trans. 1757, p. 112), and in Cambridgeshire (Jenyns' 'British Vertebrate Animals,' p. 34), in Berwickshire and in Perthshire (Neill, 'Wernerian Memoirs,' vol. iii., p. 207). In the ninth century the animal was known by the Welsh as "Llosdlydan" (Leges Wallicæ, iii., 11), and in Gaelic it is still termed from tradition "Losleathen." For some further particulars on the subject the reader may be referred to an article entitled "Beavers, Ancient and Modern," which appeared in 'The Field' of March 22, 1873.—ED.

The last of the mammals to arrive on the British Islands after the glacial period may or may not have been **MAN**. It is not likely, however, that he would have pushed northwards in a land destitute of the animal food on which he must have depended for his existence; it is probable therefore that the large herbivorous quadrupeds at all events preceded him. It is clear, moreover, that he lived on the same area with them, as proven by the discovery of his flint implements in conjunction with their remains in caves and peat-bogs. In Brixham Cavern flint instruments of the chase, comprising arrow and spear heads, axes and knives of stone, have been found mingled with the broken bones and teeth of the Bear, Lion, Great Horned Deer, Reindeer, Red Deer, Roebuck, Wild Horse, Elephant and Rhinoceros. In Kent's Cavern, at Torquay, where the Fauna were more numerous, the same conditions have been observed. In the Gower Caves, Wokey Hole, and many other situations, the proofs of man's contemporaneous existence with these extinct animals are placed beyond a doubt. It is clear, moreover, that in some instances he contributed towards, and in others succeeded in, exterminating many of the quadrupeds just mentioned; but, so far as the evidence yet extends, it is not certain that he dwelt on British soil before the glacial period.

Although stone implements, more or less rude in construction, have been discovered in Ireland and Scotland, there are no recorded instances of their having been found associated with the bones of any extinct quadrupeds; at the same time there can be little doubt that the stone arrow and spear points, wherever found, are indications of the venatorial habits of the people who fabricated them. The evidence perhaps is more circumstantial than direct; but, taking into consideration the small number of flint tools found in Ireland, with the abundance of the remains of its giant deer, it is probable that, if man existed on the island at a time when it was overrun by herds of this animal, he would have destroyed them, and their broken bones would bear traces of his violence.* But this is not the case; whilst in England the long bones have often been found broken in such a manner as to indicate that they were split by man for the sake of the marrow which they contained.

Such are a few of the most remarkable animals which lived and died on British soil during what may be styled a period insignificant in duration as compared with the antiquity of the æons which preceded. It is not the object of the writer to deal with the details from which the various periods have been differentiated; but, in conclusion, the reader is invited to realise the belief, founded on a study of the phenomena as deciphered by such geologists as Lyell, Ramsey, Forbes, and others, that the intervals of time, both before and after the junction and separation of the British Islands and the European Continent, embrace four distinct periods. These may be set down as follows:—

Period I.—A general continental land, when the British area was a continuous portion of Western Europe.

Period II.—A submergence by which the land north of London and the Thames, and Bristol with Ireland, was reduced to an archipelago of frozen islands.

Period III.—When the sea-bed rose again, and the land equalled if not exceeded in extent that of the first period; the physical outline, as far as the mountains and rivers are concerned, being at first much the same as at present, only that the land rose higher above the sea, until the cold or glacial period, when the land first sank, and then was re-elevated, when the climate, still rigorous, gradually became milder, and the animals, many of which had retired to the south as the glacial period set in, again returned to their former haunts, whilst not a few became extinct.

---

* The statement made by Mr. Betham in 'The Field' of the 25th December, 1876, regarding the discovery of a flint arrow-head in the rib of an Irish Elk, would, of course, at once settle the point at issue. It is not, however, by any means the only asserted instance known to the writer; but unfortunately the objects have not been preserved, whilst all so-called examples hitherto subjected to the critical inspection of comparative anatomists have been proven to be the result of injuries or disease, not inflicted or caused directly by human agency. The natural historian, therefore, is bound to be careful in accepting evidence, unless authenticated by competent authorities, or the presence of the objects themselves. A rib of an Irish Elk with a hole through it is figured in Owen's 'British Fossil Mammals.' This may have been done by man, but the chances are that the injury was caused by the point of an antler of an antagonist.—*A. L. A.*

Finally, Period IV.—After an interval, more or less lengthened, the ultimate separation of the British Islands from the European Continent, and of Ireland from England took place, resulting in the geographical outline now delineated in a map of Europe.

Unreckoned ages are included in these changes, and no one can form even an approximate idea, according to modern computation, of their extent or duration.

THE NATURAL HISTORY OF DONEGAL.

[At a meeting of the Glasgow Natural History Society, held on the 30th January last, the following paper, entitled "Notes on the Natural History of County Donegal, with some Account of its Archæology," by Mr. James A. Mahony, Corresponding Member, was read. The paper was illustrated by an enlarged map of County Donegal, and was accompanied by lists of the phanerogamous plants and ferns, and of the birds of the district.]

A GLANCE at a map of Donegal will show that it is a county of considerable extent, generally very hilly, and with a coast line of most irregular character. Lough Swilly, Mulroy Bay, and Sheephaven are arms of the sea penetrating southward from the Atlantic from twelve to sixteen miles, and modifying the climate so much that when snow falls, as it does very rarely, it never lies, but disappears in a very short time. These deep-sea fiords, with their rich marine fauna and flora, the coast outside beaten by the Atlantic surge, the numerous fresh-water loughs—many of them of considerable size—the bogs, mountains, marshes, sands, and cultivated grounds, present such a variety of conditions as is most favourable to the student of Natural History. I propose briefly giving some account of the Geology, Botany, Zoology, and Archæology of the district.

The primary and metamorphic rocks form the backbone of the County Donegal. In very local patches, and in small quantities, the more valuable minerals and metals occur. Lead, copper, silver and gold have been found, but so sparingly as would not repay the expense of working. The post-tertiary deposits are everywhere met with, and are often full of interest. The boulder clay is very general over the county, but, unlike its equivalent near Glasgow, it is a loose agglomeration of sand and hunch-backed pebbles and large stones. At Bloodyforeland it forms a cliff 110 feet in height, the matrix being a drab-coloured clay. Overlying the boulder clay in many places is a coarse gravel, highly charged with peroxide of iron; and where this is overlaid by the turf the stratum of gravel in contact with it is seen to be white instead of a reddish colour: this seems to be caused by the deoxidation of the iron by the organic matter in the turf. Bog-iron is to be found wherever the land is bleak and barren, and hundreds of tons of it are shipped annually to England, where it is used instead of lime for the purification of gas. Along the shores of Lough Swilly a light blue clay is found about forty feet above the present sea-level: it contains numerous fragments of shells, and seems to mark the old sea-beach. Bog is the surface deposit on a large portion of the county, and in some places it is as much as twenty feet deep, with trees occurring abundantly in it. In an island in the Rosses district the sea beats against a seven-feet cliff of bog, and in different places trees can be seen submerged, and the structures known as "smelting-pots," which were used some centuries ago for reducing iron, have been seen in three fathoms water. These facts point to a comparatively recent depression of the land, and this is apparently going on, although it is in no place so well marked as in the Rosses district.

The influence of plant-life in modifying geological conditions is not so often referred to nor so well understood as its influence in modifying climate. An instance of the former may be noticed. At Glassagh, in the district of Faunett, thirteen miles from Ramelton, the shores at one time were very sandy, and the kelp made from the seaweed cast in there brought only a low price; but some years ago the Earl of Leitrim planted all the bare sand above high-water mark with bent, which has held the sand together, so that now enough vegetable soil has been produced as permits of the growth of a sward composed of *Viola tricolor*, *Anthyllis vulneraria*, *Erodium cicutarium*, some of the coarse grasses and arenaceous mosses. The sand has been gradually disappearing, and the shore consists now of granite rock and beautiful pebbly strands, enabling the cottars to secure the weed free from sand, and to get the highest price for their produce. On the same Fannet coast the marine Algæ may be studied without much effort, as every tide washes in very perfect specimens of many of the deep-sea species, while the rock-pools are brilliant with *Cladophoræ*, *Chylodadiæ* and *Polysiphonia*, and an abundance of *Codium tomentosum* and *Laurencia pinnatifida*. The economic uses of the Algæ, described as useless by old Virgil, is well illustrated here in early summer. In May the old frond of *Laminaria digitata* becomes constricted, and is pushed off by the new frond, and the first storm drives in masses of this weed, forming often a bank four or five feet in depth: the natives call it "Scie weagh," meaning the May fleece, and the scene when it is coming in is an animated one. In one bay seventy carts may be counted, the horses up to the girths in the sea, and the natives forking up the precious crop. In the Faunett district, which has a coast of six miles, 8500 tons are secured, which, when dried, produces about 400 tons. From the beginning of August till the end of September is another busy time, when the "harvest weed" comes ashore: it consists of the variety *stenophylla* of *Laminaria digitata*, which is quite entitled to be ranked as a species, as it sheds not only its frond, but also a portion of the stipes, and its structure and chemical constitution are entirely different. Leaving the shore and going further west, one is struck by the abundance of the royal fern, which, instead of being the nearly extirpated rarity it is in the Clyde Valley, is here a common weed, growing in clumps like a little forest: it is disliked by the farmers, and, along with rushes and mosses, are all to be banished by drainage, "when the times mend." Ferns are not so specifically numerous as in Scotland.

In Marine Zoology there is much to interest and delight the student. At a short distance from the shore the boat glides over a stretch of *Laminariæ*-covered bottoms, where the large *Eclimus spheræ* may be seen prowling over the brown seaweed in the society of numerous star-fishes, shoals of *Medusæ*, and the beautiful zoophyte, *Cydippe pileus*, while multitudes of dogfish sport along the surface. The estuarine shores of Lough Swilly yield numerous species of Mollusca, while at Fort Stewart the whole littoral zone is covered with the shells of *Anomia ephippium* and *Pecten striatus*, and thousands of the valves of the oyster recall the days when that succulent bivalve could be bought here for threepence per hundred.

As for Mammalia, the Otter is too frequent. The Squirrel, Ferret, Fox, Weasel, Bat, and Hedgehog are often to be seen, and it seems to be quite true that there are no toads, moles or snakes in Ireland. The Black Rat (*Mus rattus*) is said to be found in an island in Mulroy Bay, but this requires confirmation.

Donegal can give a good account of birds, from the lordly Eagle downwards. The Golden Eagle has been often shot, and sometimes captured alive. The Peregrine Falcon and Merlin have been kept for long periods in confinement; and some have succeeded in making pets of the Barn and the Tawny Owl. There is a sufficient variety of song birds to keep up an interest in these charming neighbours. The Song Thrush (*Turdus musicus*) makes musical the dawn and gloaming from February till the middle of April: one fine performer which sings in a horse-chestnut in the garden brings flocks of the villagers specially to hear what they call the "Irish Nightingale." The Wren, Bullfinch and Swallow build about the houses, as do numerous Blackbirds; and in winter may be seen every day the Common Crane,* the Waterhen, and the Cormorant, and sometimes the gleam of the Kingfisher may be marked in his swift flight up the stream. Wigeon, Teal, and Bernicle Geese frequent the muddy flats of the Swilly in winter, and are shot in numbers by those enthusiasts who choose to lie out all night in a flat-bottomed boat.

By the student of antiquity the County Donegal is held in reverence as the birth-place of St. Columb, and numerous are the legends connecting him with every hill and lough. The island of Tory is said to have been the scene of his missionary labours and miraculous exploits; but be that as it may, it is an island full of interest to the antiquary. Besides the old croms and round towers, which have been so carefully built that they resist effectually the climatic influences, and justify the poet in speaking of them as "the conquerors of time," the crannoges, or lake dwellings, which in the earlier periods of Irish history were preferred by the Irish chiefs to buildings on the mainland, are objects of great interest. The drainage of lands, which has been going on for the last few years, has revealed many of these old dwellings, long lost to sight, and at Portlough, four miles from Ramelton, one has recently been revealed which affords a fine example of the nature and uses of these settlements. The shell-mounds, which are common in the district of Faunett, are of considerable interest: they are invariably near the shore, above high-water mark, and are easily recognisable, even at a distance, by their rising eight or nine feet above the level sand. They all contain heaps of rough stones, which may be the remains of the hut, but the bulk of the mound is composed of shells of such edible mollusks as *Littorina littorea*, *Patella vulgaris*, *Cardium edule*, &c. Bones also of the cow, horse, sheep and pig are common, and are almost always split up—an entire bone is rare. These shell-mounds are less rich in remains than those of the Hebrides, and they cannot claim to be of high antiquity; that they are not of yesterday, however, is clear from the fact that on the shore adjacent no periwinkles or limpets can now be got, and the oldest inhabitant has no tradition of their origin. Their probable date may be the fifteenth or sixteenth century.

---

* The bird here intended is the Heron, which in many parts of Ireland is called the Crane.—Ed.

——o——

ORNITHOLOGICAL NOTES FROM BEVERLEY.

By Frederick Boyes.

A remarkably cold and backward spring, with a long continuance of easterly winds, may account for the non-arrival in 1876 of at least one summer migrant and the appearance in diminished numbers of some others. But whilst it deprived us of these, it appeared so to check the northward migration of our winter birds that, in one or two instances, they found it convenient to remain and breed with us. To this cause, at least, I attribute the breeding of the Hooded Crow, Spotted Crake, and some other birds in this neighbourhood in the summer of 1876.

Although I cannot say that we had any remarkable feature worth especial mention, we had nevertheless some very interesting occurrences which were unusual and new to me. These were the breeding of the Redshank in three or four different localities; the nesting of the Red-backed Shrike, and that of the Spotted Crake, which latter fact, though not absolutely established, is so far proved that I think there is no doubt about it.

My notices of the arrival of our spring migrants are very incomplete, owing partly to the very cold weather, which prevented them giving their well-known notes, and partly to their great irregularity in arrival, so much so that in many cases I gave up looking for them. I do not at any time attach much importance to these records, as it is manifest that at best they are very unreliable. A single bird may arrive in the neighbourhood and go unnoticed for weeks unless some one who knows it discovers it. Again, I may put down the date of my first hearing or seeing a certain bird here, whereas it may have appeared a fortnight earlier a few miles away. So, too, some birds do not make their presence known immediately on their first arrival. The Corn Crake is one of these, and it generally remains mute until sufficient shelter is afforded it: this is proved by finding them with pointers or setters when none have been heard thereabouts, or perhaps not at all that season.

On February 10th I saw, in the snow on the river-side, the footprints of a Bittern. It had walked to several places where the sedges were highest, evidently looking for a place of concealment, but the shelter apparently had not been sufficient, for it had then walked back to the water-side and taken wing. Two of these birds were seen several times during the winter at a private piece of water here, where the owner always preserves them: I am told that one or more are seen there almost every winter.

The dreadful storm of thunder and lightning we had early in March, accompanied by a deluge of rain, caused the river again to overflow its banks, and once more all our low-lying "carrs" were under water for many miles. In consequence of this, vast numbers of Peewits, which annually breed in these low grounds were driven away from their breeding haunts, and the eggs of such as had laid were of course destroyed. These low grounds called "carrs" lie adjacent to the river stretching beyond Beverley northward almost to Driffield, a distance of about twelve miles, and are liable to be submerged at any moment by the bursting of the river-banks. In former times the river annually overflowed, and all the adjoining land below a certain level became swamp and bog, and in many places open water. Indeed, up to the beginning of the present century there was no means of getting the water away. Many hundreds of ducks used to be taken here in decoys, and even now no sooner do the fields get submerged than they are at once frequented by great numbers of wild-fowl.

About the 11th of April, when the water in the "carrs" had partly subsided, a Ruff and three Reeves were seen, and the Ruff and one of the Reeves shot. The male bird was in transitional plumage, just acquiring a beautiful glossy black ruff, and a few warts were appearing near the base of the bill; the frill, so far as it had been assumed, was composed entirely of new feathers.

During the summer of 1876 the Nightingale was absent from East Yorkshire. Considering, however, that we are on the extreme northern limit of its range, it is not surprising that it should fail to reach us in such a miserably cold and backward spring as that of 1876.

A female Hawfinch, with considerably developed eggs in the ovary, and which had been previously shot at and wounded, was picked up alive on May 7th on Westwood Common, where—as I have already mentioned (2nd ser. p. 4763)—two nests were taken last year. It appears they have again returned to the same place to breed. I afterwards made a search and found three nests, two apparently those of last year, and the third barely finished. At the last-named the old bird no doubt was at work, for it made a great outcry when I went near it. I thought it looked scarcely completed, but knowing what a flimsy and unfinished kind of nest this bird makes, I climbed up to it, and must have been seen, for it was afterwards forsaken.

On the same day a Black Tern and a Common Tern were shot on our river; and I may here mention that it is a common practice for people to go up the river in a boat on Sundays, and shoot anything and everything, whether protected by the Sea-birds' Protection or any other Act.

On the 10th May I saw a beautifully-plumaged Oystercatcher on the river-side: this is the first time I ever saw or heard of one here. The following day I heard a Ring Ouzel singing, and saw a large flock of Fieldfares. The 11th May seems a late date at which to find the last-named birds here, but they remained with us this year until May 19th.

For upwards of sixty years a pair of Missel Thrushes have nested in our garden, with scarcely an exception. This spring the old gardener came to me, with a mournful look, and said he was afraid something was going to happen, as he had not noticed them about as usual; but when I pointed out to him the old bird sitting on her nest high up in a pear tree, his face brightened up, and he said, "Hey! well, that's all right! I am glad." So much for superstition. Last year they built in a tree overhanging the middle walk, and the old bird flew off every time anyone went near. I was surprised at the length of time she remained away from the nest, and fully expected the eggs would be addled, but she hatched off safely. This year she sat so close that, for so shy a bird, I could not have credited it had I not been a witness of it. She would allow me to fire off my gun beneath the tree without quitting the nest. I had been constantly shooting Sparrows for some time before I noticed this. Twice these Missel Thrushes have reared two broods in the same nest. There are three or four trees in which they invariably build, but very seldom nest two years in the same tree. Only one pair returns each year.

A male Shoveller and a male Teal were seen on the river on May 21st, which looked as if the ducks of each species were sitting somewhere in the neighbourhood.

In the "carrs" near the river, about six miles from Beverley, two pairs of Redshanks were nesting, for the first time, to my knowledge, on May 24th. No doubt the swampy nature of the ground from the recent floods had invited them to remain. The actions of these birds were very interesting and new to me. They toyed about a long time and were very noisy; one of them alighted on some posts and rails near me, whistling and making a chatting noise like the word "chick, chick, chick, chick," repeated any number of times. Presently it rose on the wing and flew a little way, gave a few very rapid vibrations of its wings, then held them pointed downwards in a peculiar manner, reminding one of the Common Sandpiper as it skims along a drain, or a butterfly that has been nipped the wrong way in the net. Every now and again it would return and go through the same performances. A Dunlin in full summer plumage, on the river the same day, was probably on its way to its breeding haunts.

On May 27th four young Redshanks, a few days old, were found, and I regret to say the old female, after five or six unsuccessful shots, was killed, on one of our commons called Swinemoor. This common lies very low, and was once a swampy morass where the Bittern and Redshank held their sway: it is now drained and made into a pasture for cattle and a so-called "recreation ground" for the people. [We regret to learn that the Wild Birds Protection Act is not more respected there. A momentary consideration ought to convince the shooter that a nesting bird is as useless for the table as, from its ragged state of plumage at this season, it must be to the collector.—Ed.]

The Red-backed Shrike is a very rare bird here, and I cannot hear that one has been seen for fifteen years. On May 27th a hen bird of this species was shot, and the following day a pair were obtained. A circumstance occurred in connection with the capture of these birds that is perhaps worth mentioning. It appears the male and female were both sitting on a dead branch near each other when the female was shot. The person who shot it repaired to the same place early the following day to shoot the male, when he found a second female: this he shot, and later in the day he shot the male. Is it possible that the male had two wives? It is scarcely reasonable to suppose that he could have picked up another mate in so short a time in a part of the country where these birds are so rare. I ought to mention that the first female was laying, and had an egg fully developed in the ovary. A search was afterwards made, and the old nest containing one egg found near the spot where all the three birds were shot. The second female was a younger bird, and showed no signs of breeding, the eggs in the ovary being very small. The stomachs of these birds contained nothing but humble-bees, the largest and commonest kind, with the yellow bands on the abdomen. [What a thousand pities that these inoffensive birds should have been shot, especially since they are stated to be so rare in the neighbourhood.—Ed.]

I think I may safely say that the Spotted Crake nested on the margin of our river in May, 1876. I have never before heard them in the summer, though we generally have plenty in the autumn. The males begin to call at dusk, like Corn Crakes or Quails, only the note is very different, and may be imitated by pronouncing quickly the words "gluck, gluck" every three or four seconds. They were calling loudly on May 27th, and continued to do so for some weeks, almost always in the same places. I sought diligently for a nest, but from the large amount of shelter afforded by the sedges at this time of year, I was not able to find it.

On June 5th a Nightjar was sitting on two eggs. I have seen several of these birds sitting on their eggs here in the open moory ground, and it is by no means a fact that they always turn their heads away from the sun. [From our own observations we can confirm this. No bird is fonder of basking in the warm sunshine than the Nightjar. We have found it sitting on the shingle at the seaside, where the stones were so hot with the noonday sun that the hand could scarcely bear the contact.—Ed.]

During the month of October last we had an immense number of wild geese in this neighbourhood, more than have been known for a very long time. I think they were attracted by the quantity of food, for in consequence of the long continuance of wet weather many of the wold farmers were unable to gather the rakings of the stubble, and these formed an abundance of food for the wild geese, which at early dawn arrived in hundreds. On the 15th of that month a very fine female Rough-legged Buzzard was shot at Holderness. On the 21st another was shot: it had been seen in company with the one killed on the 15th: this bird unluckily fell into the Humber, and the tide going out it was lost. On the 18th November a third was killed at Hull.

A Shore Lark was shot at Spurn on October 21st, and an immature male Longtailed Duck on November 8th. On the 22nd of that month another Longtailed Duck was shot, a female, and on December 8th a third. These were obtained on the same piece of water where I had seen a small flock on September 29th.

On the 22nd November a fine male Osprey was brought for my inspection by Mr. D. Burton, of Cherry Burton, a village three miles west of Beverley: it had been shot the previous day by one of that gentleman's keepers just in front of the Hall. I may say that it was a most unlikely place for such a bird, as there is no water in the immediate neighbourhood. Probably it was passing over on its southward journey, or it may have got lost during the thick weather which prevailed about that time. Why it did not soar high enough to keep out of gunshot I cannot tell. I dissected it, and found it in very good condition, although not fat. The stomach was empty, except a piece of stick and some dead grass—foreign substances, swallowed, no doubt accidentally, with its natural food. This is the bird mentioned by Mr. Cordeaux as shot on the 23rd November, which is the wrong date, as I had word sent to me by the keeper the very day of its capture, and the bird was in my hands the following morning.

During the last week of November large flocks of Wood Pigeons (Ring Doves) passed over the town of Beverley, the wind at the time being westerly. These birds may generally be seen flying over this district during strong westerly gales, and invariably fly against the wind.

An old male Rednecked Grebe shot on our river on December 5th still retained some of the red on the throat.

There was a very large advent of wild-fowl in the Humber on Christmas Day. My informant, who is a capital shot, and has lived on the Humber-side all his life, said he never remembered to have seen so many geese and ducks in the Humber in all his experience, and I am certain no one could be better qualified to give an opinion. Amongst the slain on this side of the Humber were three Bernicle Geese: they were shot by a young farmer, a son of the person above referred to.

ORNITHOLOGICAL NOTES FROM ST. ANDREWS, N.B., DURING THE AUTUMN AND WINTER OF 1876.

By W. J. Kerr.

The ancient city of St. Andrews stands upon a small and somewhat rocky promontory on the eastern seaboard of Scotland, in front of which stretches an arm of the sea called St. Andrew's Bay, bounded on the south by that portion of the county of Fife terminating in Fife Ness (in the provincial dialect known as the "East Neuk o' Fife"), on the north by Forfarshire, terminating in the bold rocky headland called the "Red Head." To the north of the town is the small and dangerous harbour, and beyond, towards Fife Ness and the mouth of the Forth, a somewhat monotonous line of rocky coast scenery, nowhere attaining a sufficient altitude for the nesting of sea-birds. These low rocks, however, when uncovered at low tide are the favourite resort of such birds as the Turnstone, Purple Sandpiper and Rock Pipit. On the north the coast is of a perfectly different character, being flat and sandy, a natural line of sandhills preventing the sea from overflowing a low-lying cultivated country which stretches for some miles inland. Two miles to the north of the town the River Eden flows into St. Andrew's Bay. This sluggish stream forms at its mouth an estuary of some three miles in length and about a mile in width: at high tide it has the appearance of a salt-water loch and at low tide forms a considerable extent of mud-flat and mussel-scaup, peculiarly adapted to the requirements of waders, sea ducks, *et id genus omne*—an advantage, I am glad to say, which they seem fully to recognise and appreciate. Beyond the Eden to the Tay lies a bleak and wild moorland called "Tent's Muir," skirted on the seaside by a line of sandhills. This dreary uncultivated tract of country abounds in rushy pools and peat-bogs, the home of Snipe and Duck, where doubtless long ago the "boom" of the Bittern was often heard—a sound which, alas! no longer greets the wild-fowl shooter as he returns from the evening flight-shooting. Some interesting birds breed yearly on this moor, among which may be mentioned the Eider Duck, Shieldrake, Curlew, Golden Plover, Redshank, Dunlin, and a large colony of Terns. The locality therefore must be regarded as a most favourable one from which to study the habits of wild birds in their proper haunts. I will only add that such notes as I may contribute to 'The Zoologist' will be penned solely from my own observation.

On the 2nd September I shot a Greenshank up the Eden: a few of these birds are procured every autumn, but only *en passant;* none seem to remain through the winter. During this month the mud-flats at the mouth of the river present a very lively appearance, owing to the numerous flocks of various waders which for a time pay us a visit *en route* for more southern shores. Among others I noticed several flocks of Bartailed Godwits and Gray Plovers; one of the latter which I shot—evidently a young bird of the year—was so much marked on the back with a light shade of yellow that I took it for a young Golden Plover, and it was not until I got home that, by the presence of the hind toe, I detected the species. The first wild geese seen this autumn were observed flying over the links on September 26th.

Early in October a great number of Gannets were fishing in the bay, mostly young birds of the year, doubtless from the Bass Rock, which is but a short distance off. On the 7th a Red-breasted Merganser was shot. Enormous flocks of Plovers, both Green and Golden, breed on the hills inland, and frequent the mud-flats at low tide and the adjoining fields at high tide during the autumn, but leave us towards the end of October, a small number only remaining throughout the winter. Several Knots killed out of a large flock on the 16th retained traces of the summer plumage: in some specimens the whole of the breast was suffused with a light buff-colour; these are doubtless young birds of the year.

Returning home at dusk from shore-shooting on October 18th, two small waders rose close to me, and began wheeling round, uttering a plaintive but pleasing note with which I was not familiar, eventually settling some thirty yards off. One which I shot proved to be a Little Stint. This small *Tringa* seems to be somewhat rare on this coast; I have not noticed it before, and the gunners do not seem to know it. Probably it is a regular autumnal visitor, but from its small size is apt to be overlooked. Mr. Harvie Brown informs me he has procured specimens upon the Forth on several occasions.

On the 19th October I shot a Curlew Sandpiper out of a flock of Dunlins: as they flew past me a third at least of the birds appeared to be white-rumped, but although I dropped six of the number I only procured one Curlew Sandpiper. When snipe shooting on Tent's Muir on the 27th I saw a Marsh Harrier on the wing. The Snow Bunting was first seen on the 30th, when a single bird was procured.

During the first week of November about a dozen Turnstones were observed on the rocks below the town. These birds seem to be local on this part of the coast: I generally find them about the same spot, feeding on the rocks uncovered at low tide. The first fall of snow of any consequence was on the 9th, on which day a few Bramblings were seen amongst a flock of Chaffinches and Linnets; large flocks of Larks, Fieldfares and Redwings were flying south in continued succession all day. A flock of about two hundred wild geese passed over the town on the 29th; they have been very scarce in this neighbourhood during the past autumn and winter.

On the 3rd December I noticed several Skuas chasing the Gulls that were fishing on the Eden bar. Amongst the latter was a Kittiwake: this species, although it is numerous enough during the summer, and breeds in some numbers on the Island of May—a few miles distant, is rarely seen here in the winter.

When shooting along the coast with Mr. Harvie Brown on the 6th December, we noticed flying towards us over the bay at a great height an immense number of Wood Pigeons. The flock must have been about five miles in length, and was preceded by a closely compact advanced guard, which in itself must have consisted of some hundreds of birds, the remainder following in a long straggling line. We watched them for some time after they had passed us as they flew in a north-westerly direction, until lost to sight over the Forfarshire hills. When just seen they were some miles out at sea, the coast of Norway lying behind them, and we had no doubt that the flock we had observed was migrating from that country.

Amongst a lot of gulls seen flying along the coast on December 15th, I observed several immature specimens of *Larus glaucus*.

From the number of Short-eared Owls which were brought to a birdstuffer in the town for preservation during the month of December, it would seem as if this species had visited us in unusual numbers this winter.

During the last week of December three Whoopers visited the estuary of the Eden. I did not see them myself, but heard of them from several persons, one of whom, a famous wildfowl-shooter and good field ornithologist, informed me that a wild swan which passed within eighty yards, and which he shot at, whooped several times a note with which he is familiar from having often heard it in the Solway Firth.

ORNITHOLOGICAL NOTES FROM DEVON.

By John Gatcombe.

In consequence of the severe and long-continued gales during the month of January, Kittiwakes became exceedingly tame and very numerous in our harbours, and I am sorry to add that hundreds were wantonly shot. Northern Divers were plentiful and almost daily brought to our birdstuffers; but it seems remarkable that among so many specimens a really adult bird was rarely found, and I have lately been much struck with the great difference which is observable in the plumage of the fully adult bird in winter and that of the young bird of the year. Although all the upper plumage of the old bird is more or less tipped and edged with gray, yet the general markings have not that wavy appearance so observable in the young, but show a great resemblance in form to the white spots and oblong square patches of the summer dress: the dark band on the neck, too, is much more conspicuous. The adult bird in winter may also be distinguished by the shape of the larger feathers of the back and scapulars, which are nearly square at the tips, instead of rounded as in immature specimens.

For some time I daily watched a large Northern Diver with my telescope, and could easily distinguish it from others, at any reasonable distance, by its plumage alone, and on visiting a birdstuffer's shop one day I at once recognised the poor bird lying dead on the table. On examination I found that, as I suspected, it was an old bird in full winter dress. The stomach contained some crabs and a few stones, but no fish-bones.

Shags were very plentiful in January, and it was astonishing to see the ease with which they dived in the midst of a tremendous surf amongst the rocks without the least injury; indeed I have sometimes seen them washed clean over the top of a rock by a large wave. Many Gannets were obtained by the fishermen off Plymouth, either with a baited hook or the old plan of a board and fish; many also were washed ashore.

On the 6th January a large Glaucous Gull was seen flying up the Hamoaze, and on the 14th of the same month I saw another: they were both in immature plumage. On the 15th there were immense flocks of Golden Plover and Lapwings on the Plymouth Racecourse, or Chelson Meadows, which are very swampy at this season of the year. The following day a Lesser Spotted Woodpecker was killed near Plymouth. Great Black-backed Gulls were very numerous in our harbours and on the coast.

On January 19th I observed two adult Swans flying up the River Tamar at a great height, and some days afterwards the following paragraph appeared in a Cornish paper:—"Two wild Swans, perfectly white, were killed at St. Endellion on Monday, the 25th." No doubt, the same birds seen by me.

The Bartailed Godwit seldom remains with us during the winter, but one was shot near Plymouth on January 28th. On the 31st I bought a very fine Rough-legged Buzzard, in the flesh, which was shot on Ditsworthy rabbit-warren, Dartmoor, by the warrener's grandson, a little boy about eight years of age, who killed a splendid old Snowy Owl at the same place in March, 1876. This buzzard was extremely fat, and its stomach contained the remains of a small rabbit; when shot it was in company with another bird of the same species. Rough-legged Buzzards, however, are rarely obtained on Dartmoor.

I saw several immature Black Redstarts during the month of January, and I am told that some Gray Phalaropes were seen swimming off the quay at Penzance on the 25th of that month.

In February many Great Northern Divers and a few Red-throated Divers were brought to our birdstuffers; indeed the former birds have been more plentiful during the present winter than I can remember for many years past. Mr. Stephen Clogg, of Looe, Cornwall, informs me that he observed two of them fishing above the bridge at that place—a circumstance which he had never previously noted during a residence of forty years. Through the kindness of the same gentleman, I was enabled to examine a beautiful variety of the Arctic Tern, which had been killed by a boy with a stone during the past autumn. It appears to be a young bird of the year, pure white, with the bill and legs red, but unfortunately the colour of the eyes was not noticed. It is now in the collection of Mr. J. Marshall, of Belmont, Taunton, who informs me that he has lately obtained a milk-white Jay (shot near York), a white Pipit, a pied Red-breasted Pipit, and a buff Red-breasted Flycatcher—the three latter procured in the neighbourhood of Constantinople.

During the early part of February Razorbills and Guillemots appeared in some numbers on our coasts, and many adult and immature Great Black-backed Gulls were shot. A Shieldrake—a species seldom obtained in this locality except during very severe weather—was killed in the neighbourhood on the 13th.

By February 16th Cormorants had well advanced towards their breeding plumage, gray feathers appearing about the head and neck, and the white patch above the thighs very conspicuous. A Great Spotted Woodpecker was brought to a Stonehouse bird-stuffer on the 17th of that month, and another on the 23rd: this species is much more commonly met with near Plymouth during winter than at any other time of the year. On the 22nd I observed a Black Redstart on the coast. By that date Chaffinches were in full song, and many Black-headed Gulls had assumed the dark hood. By February 26th Guillemots had assumed the perfect breeding-plumage.

——o——

OBSERVATIONS ON EGG-BLOWING.

By Edward Bidwell.

During the last few seasons I have had considerable experience in egg-blowing, and though endowed by nature with a good pair of natural bellows, I frequently found that blowing a hundred large eggs in an evening was no light task, and it occurred to me that could I devise a machine for the purpose it would be a great boon to collectors.

My first attempt was with a large india-rubber syringe attached to a blow-pipe by a tube; but I found that it did not always contain sufficient air to empty the egg. I then substituted a kitchen-bellows for the syringe, but besides being clumsy it frequently broke the egg, from the handle requiring so much pressure that it moved the blow-pipe. I then procured a cylindrical bellows, shown in the engraving, and find it answers admirably, as it works very steadily, and it is easy with this to regulate the pressure of the air to the size of the egg.

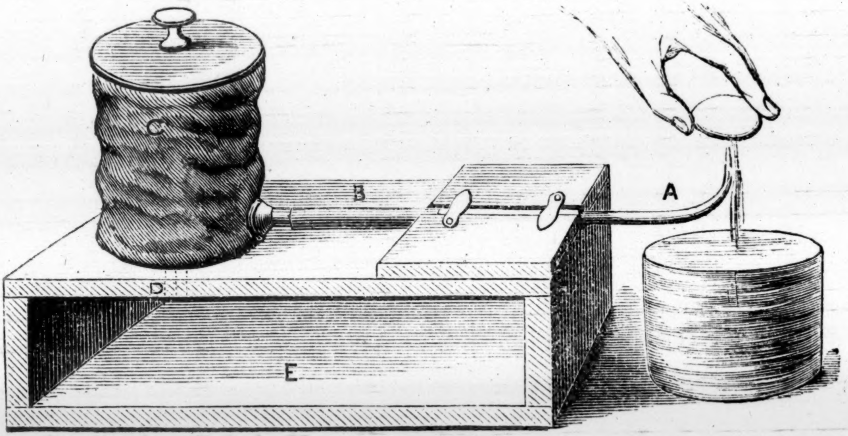

Fig. 1.

The blow-pipe (A) is held in a groove by two small buttons, so that whilst firmly fixed it can easily be removed for cleaning should it get stopped up. B is the tubing connecting the pipe with the bellows (C), which is supplied with air through a hole (D) in the wooden stand to which it is fixed. When travelling, the space E is fitted with a box for the drills, &c. For greater steadiness a block of lead weighing about two pounds is placed in the space under the bellows, or the latter can be fixed to the table by means of a small clamp. A small wooden stand is used as a rest for the left hand while holding the egg.

On the subject of drilling I should have had no remarks to offer had I not learned from Mr. Seebohm that he used a carpenter's spiral drill for eggs, which he fixed in a horizontal position. Fig. 2 shows a small appliance which I have adapted for this purpose. It is held in a vice, and is fitted with a drill, which is turned by hand. Should greater speed be required it can easily be fitted for a bow and the handle unscrewed.

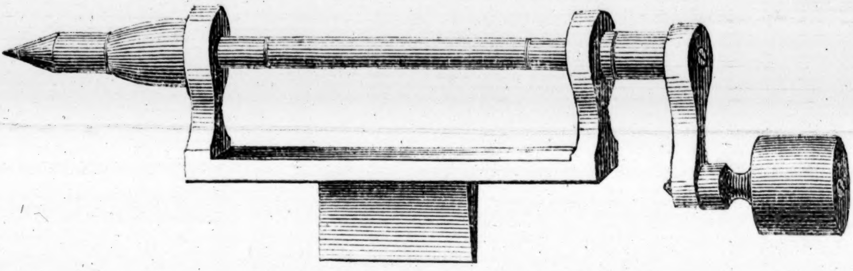

Fig. 2.

It will be found a great saving of time if, when the hole is drilled in an egg, the membrane around it be extracted with a fine pair of spring pliers. The contents come out much more rapidly, and the shell drains much sooner.*

Every egg-collector knows the annoyance and danger of cotton-wool, &c., adhering to eggs through their not having drained thoroughly, which is frequently caused by the egg rolling after it has been placed on the blotting-paper pad. To obviate this I have had thin brass tubes of different sizes cut into lengths varying from one-fourth to five-eighths of an inch and bent to an oval. If the egg is placed in this with the hole touching the blotting-paper, the nuisance of its moving is done away with. The rings fit into each other, and so take up very little room.

A small india-rubber syringe possesses great advantages over the old-fashioned "squirt" for injecting water for rinsing, as it can be used with one hand whilst the egg is held in the other, thus lessening the danger of breakage, and enabling the user to keep the exterior of the shell dry—a matter of greater importance than many consider it.

Now that collecting "clutches" is so much in vogue, it is of greater importance than formerly to bring home each "clutch" intact, and to secure this I use round tin boxes, into which five pill-boxes have been glued in a circle, thus forming six compartments. Each egg is wrapped in cotton-wool and placed in a division. Every box is numbered, and particulars of its contents entered in a rough note-book on the spot. Another good plan is to wrap each egg in tissue-paper after rolling it in wool, as, if this is not done the egg frequently works out of the wool and gets broken.

---

* There is another advantage in extracting the membrane. If allowed to remain in, it often contracts so much in drying as to cause thin shells to crack.—Ed.

The whole of the apparatus described fits into a box twelve inches long by six inches deep and six wide, and may be seen at Messrs. T. Cooke & Son's, 30, Museum Street, London, who will be happy to show it.

WILD FOWL PRESERVATION.

[We have received so many enquiries concerning the "Wild Birds Protection Act, 1872," and the "Wild Fowl Preservation Act, 1876," from correspondents who are anxious to know how the law at present stands on the subject that we think it desirable to print the two Acts *in extenso*. In doing so, we need only observe that had the legislature acted upon the recommendations of the promoters of the Bill of 1872, that is to say, the Committee of Naturalists appointed by the British Association, there would now have been one Act instead of two, much confusion would have been avoided, and such a period would have been fixed for the close-time as would have met with general approbation. Unfortunately the recommendations referred to were not adopted.—ED.]

[35 & 36 Vict., Chapt. 78.]

AN ACT FOR THE PROTECTION OF CERTAIN WILD BIRDS DURING THE BREEDING SEASON.

[10th August, 1872.]

WHEREAS it is expedient to provide for the protection of certain wild birds of the United Kingdom during the breeding season:

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same:

1. That the words "wild bird" shall for all purposes of this Act be deemed to include the birds specified in the schedule to this Act; the word "sheriff" shall include steward and also sheriff substitute and steward substitute.

2. Any person who shall knowingly or with intent kill, wound, or take any wild bird, or shall expose or offer for sale any wild

bird recently killed, wounded, or taken, between the fifteenth day of March and the first day of August in any year shall, on conviction of any such offence before any justice or justices of the peace in England or Ireland, or before the sheriff or any justice or justices of the peace in Scotland, for a first offence be reprimanded and discharged on payment of costs and summons, and for every subsequent offence forfeit and pay for every such wild bird so killed, wounded, or taken, or so exposed or offered for sale, such sum of money as including costs of conviction shall not exceed five shillings, as to the said justice, justices, or sheriff shall seem meet, unless he shall prove to the satisfaction of the said justice, justices, or sheriff that the said wild bird was or were bought or received on or before the said fifteenth day of March, or of or from some person or persons residing out of the United Kingdom: Provided nevertheless, that every summons issued under this Act shall specify the kind of wild bird in respect of which an offence has been committed, and that not more than one summons shall be issued for the same offence.

3. Where any person shall be found offending against this Act, it shall be lawful for any person to require the person so offending to give his Christian name, surname, and place of abode, and in case the person offending shall, after being so required, refuse to give his real name or place of abode, or give an untrue name or place of abode, he shall be liable, on being convicted of any such offence before a justice of the peace or the sheriff, to forfeit and pay, in addition to the penalties imposed by section two, such sum of money not exceeding ten shillings as to the convicting justice or sheriff shall seem meet.

4. All offences mentioned in this Act which shall be committed within the jurisdiction of the Admiralty, shall be deemed to be offences of the same nature and liable to the same punishments as if they had been committed upon any land in the United Kingdom, and may be dealt with, inquired of, tried, and determined in any county or place in the United Kingdom, in which the offender shall be apprehended or be in custody, in the same manner in all respects as if they had been actually committed in that county or place; and in any such information or conviction for any such offence, the offence may be averred to have been committed "on the high seas," and in Scotland any offence committed against this Act on the sea coast, or at sea beyond

the ordinary jurisdiction of any sheriff or justice of the peace, shall be held to have been committed in any county abutting on such sea coast, or adjoining such sea, and may be tried and punished accordingly.

5. Where any offence under this Act is committed in or upon any waters forming the boundary between any two counties, districts of quarter sessions or petty sessions, such offence may be prosecuted before any justice or justices of the peace or sheriff in either of such counties or districts.

SCHEDULE.

Avocet
Bittern
Blackcap
Chiffchaff
Coot
Creeper
Crossbill
Cuckoo
Curlew
Dotterel
Dunbird
Dunlin
Flycatcher
Godwit
Golden-crested Wren
Goldfinch
Greenshank
Hawfinch or Grosbeak
Hedgesparrow
Kingfisher
Landrail
Lapwing
Mallard
Martin
Moor (or Water) Hen
Nightingale
Nightjar
Nuthatch
Owl
Oxbird
Peewit
Phalarope
Pipit
Plover
Plovers-page
Pochard
Purre
Quail
Redpoll
Redshank
Redstart
Robin Redbreast
Ruff and Reeve
Sanderling
Sand Grouse
Sandpiper
Sea Lark
Shoveller
Siskin
Snipe
Spoonbill
Stint
Stone Curlew
Stonechat
Stonehatch
Summer Snipe
Swallow
Swan
Swift
Teal
Thick-knee
Titmouse, Long-tailed
Titmouse, Bearded
Wagtail
Warbler, Dartford
Warbler, Reed
Warbler, Sedge
Whaup
Wheatear
Whinchat
Whimbrel
Wigeon
Woodcock
Wild Duck
Wood Lark
Woodpecker
Wood Wren
Wren
Wryneck

[39 & 40 Vict., Chapt. 29.]

AN ACT FOR THE PRESERVATION OF WILD FOWL.

[24th July, 1876.]

Whereas the wild fowl of the United Kingdom, forming a staple article of food and commerce, have of late years greatly decreased in number by reason of their being inconsiderately slanghtered during the time that they have eggs and young; and whereas, owing to their marketable value, the protection accorded to them by the Act of the thirty-fifth and thirty-sixth years of the reign of Her present Majesty, chapter seventy-eight, intituled "An Act for the protection of certain wild birds during the breeding season," is insufficient; it is expedient therefore to provide for their further protection during the breeding season:

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritnal and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. The words "wild fowl" shall, for the purposes of this Act, be deemed to include the different species of Avocet, Curlew, Dotterel, Dunbird, Dunlin, Godwit, Greenshank, Lapwing, Mallard, Oxbird, Peewit, Phalarope, Plover, Plover's Page, Pochard, Purre, Redshank, Reeve or Ruff, Sanderling, Sandpiper, Sea Lark, Shoveller, Snipe, Spoonbill, Stint, Stone Curlew, Stonehatch, Summer Snipe, Teal, Thick-knee, Whaup, Whimbrel, Wigeon, Wild Duck, Wild Goose, and Woodcock; the word "sheriff" shall include steward and also sheriff substitute and steward substitute.

2. Any person who shall kill, wound, or attempt to kill or wound, or take any wild fowl, or use any boat, gun, net, or other engine or instrument for the purpose of killing, wounding, or taking any wild fowl, or shall have in his control or possession any wild fowl recently killed, wounded, or taken between the fifteenth day of February and the tenth day of July in any year, shall, on conviction of any such offence before any justice or justices of the peace in England or Ireland, or before the sheriff or any justice or justices of the peace in Scotland, forfeit and pay for every such wild fowl so killed, wounded, or taken, or so in his possession, such sum of money not exceeding one pound as to the said justices or sheriff shall seem meet, together with the costs of the conviction.

3. The Home Office as to Great Britain, and the Lord Lieutenant as to Ireland, may, upon application of the justices in quarter sessions assembled of any county, extend or vary the time during which the killing, wounding, and taking of wild fowl is prohibited by this Act; the extension or variation of such time by the Home Office shall be made by order under the hand of one of Her Majesty's Principal Secretaries of State, after the making of which order the penalties imposed by this Act shall in such county apply only to offences committed during the time specified in such order; and the extension of such time by the Lord Lieutenant shall be made by order to be published in the Dublin Gazette, and a copy of the London Gazette or Dublin Gazette containing such order shall be evidence of the same having been made.

4. Where any person shall be found offending against this Act, it shall be lawful for any person to require the person so offending to give his Christian name, surname, and place of abode; and in case the person offending shall, after being so required, refuse to give his real name or place of abode, or give an untrue name or place of abode, he shall be liable, on being convicted of any such offence before a justice of the peace or the sheriff, to forfeit and pay, in addition to the penalties imposed by section two, such sum of money not exceeding two pounds as to the convicting justice or sheriff shall seem meet, together with the costs of the conviction.

5. One moiety of every penalty or forfeiture under this Act shall go and be paid to the person who shall inform and prosecute for the same, and the other moiety shall, in England, be paid to some one of the overseers of the poor, or to some other officer (as the convicting justice or justices may direct) of the parish, township, or place in which the offence shall have been committed, to be by such overseer or officer paid over to the use of the general rate of the county, riding, or division in which such parish, township, or place shall be situate, whether the same shall or shall not contribute to such general rate; and in Scotland, to the inspector of the poor of the parish in which the offence shall have been committed, to be by such inspector paid over to the use of the funds for the relief of the poor in such parish; and if recovered in Ireland, such penalty shall be applied according to the provisions of the Fines Act (Ireland), 1851, or any Act amending the same.

6. All offences mentioned in this Act, which shall be committed

within the jurisdiction of the Admiralty, shall be deemed to be offences of the same nature and liable to the same punishments as if they had been committed upon any land in the United Kingdom, and may be dealt with, inquired of, tried, and determined in any county or place in the United Kingdom in which the offender shall be apprehended or be in custody, in the same manner in all respects as if they had been actually committed in that county or place; and in any information or conviction for any such offence the offence may be averred to have been committed "on the high seas;" and in Scotland any offence committed against this Act on the sea coast, or at sea beyond the ordinary jurisdiction of any sheriff or justice of the peace, shall be held to have been committed in any county abutting on such sea coast, or adjoining such sea, and may be tried and punished accordingly.

7. Where any offence under this Act is committed in or upon any waters forming the boundary between any two counties, districts of quarter sessions or petty sessions, such offence may be prosecuted before any justice or justices of the peace or sheriff in either of such counties or districts.

OCCASIONAL NOTES.

Beavers in Siberia.—The Beaver which, some centuries ago, was so numerous in Russia and Western Siberia, and which was supposed to have totally disappeared from both countries, continues to exist on the rivulet Pelyin. M. Poliakoff has procured from an ostyack on the Obi five skins of these animals killed last year, and he has engaged a hunter to procure this winter complete specimens for the Museum of the St. Petersburg Academy. No farther back than a century ago the Beaver was common on one of the affluents of the Irtysh, Bobrofka, but it has now totally disappeared from the locality, the last colony existing probably on the Pelyin.—'*Nature*,' 18*th January*, 1877.

On the Breeding of the Otter.—I am very glad to see that the breeding of the Otter is attracting the attention of your correspondents, and trust the result may be something more definite than the stereotyped "three to five young ones in March or April." I have long paid great attention to the habits of the Otter in the county of Norfolk, and so far as I have been able to ascertain with certainty, the young ones are almost invariably born in the dead months of the year. I read with interest Mr. A. H. Cocks' note on the breeding of the Otter (p. 100), but cannot agree with his conclusions that "Otters, with other animals, appear to breed most commonly in the spring"; and I am inclined to think that the instances adduced tend to prove that such is not generally the case. It is very difficult to judge the age of a young Otter, they differ so much in size and weight, but judging to the best of my ability, from the data given I should think the ten young ones mentioned by Mr. Cocks would be born somewhat as follows:—No. 1, early in September; No. 2, early in January; No. 3, early in August; No. 4, October; No. 5, February; No. 6, February; No. 7, November (?); No. 8, March (?); No. 9, October (?); No. 10, May (?). There is, I think, more uncertainty about the last four than there is about the others. This shows a sufficiently wide margin certainly, but if I am right in my estimate of their age, only two of the examples mentioned appear to have been born in the spring. One of the young ones now in the Zoological Gardens Mr. Cocks says must undoubtedly have been born in the autumn, and indications mentioned by that gentleman as observed in the case of the two females now in his possession seem to point to the dead season of the year as the most probable period for the young to be born. In 'Land and Water' for March, 1873, it is stated that a young Otter which could not see (*sic*) was picked up dead on the banks of the Want, a tributary of the River Don, on the 15th December, 1872. In the same paper for January 16, 1875, two young Otters are said to have been killed while in company with their mother near Maidenhead on 10th January, 1875; and "a little baby Otter" is said to have been caught by the tail in January, 1875, by a man lying in ambush for wild duck at Llechrhwyd, in the issue of the same journal for April 10, 1875. The following cases in which it is possible to form an approximate idea of the age of the young ones, or in which the condition of the female indicated the time of breeding, have come under my own notice since the paper to which you did me the honour to allude (p. 18) was published:—

February 23, 1873. A female big with young.

March 15, 1873. Female and young one; the latter 20 inches long and 1¾ ℔. weight. probably six or eight weeks old.

April 12, 1873. Two young ones, both females, 25½ inches long and 4¼ ℔s. weight, and 25⅞ inches long and 4½ ℔s. weight respectively—probably rather under four months old.

End of November, 1874. A female giving suck (Rev. E. J. Blofield).

November 24, 1876. A female giving suck; three teats on each side all distended with milk.

December 26, 1875. Three young ones, one of which was taken alive: when I saw it on the 30th April following I took it to be about six months old.

January 5, 1877. An old female and three young ones. The female was still giving suck (three teats on each side all in use); although the young ones measured 35 inches long they still retained their milk-canines; the permanent canines were well grown—much larger than the milk-teeth: I have several times noticed this in young Otters. Of these three young ones I cannot guess the age, nor do I know the weight, as I did not see them in the flesh.

I mention these particularly, as they seem to tell against my theory as to the period of birth, and are almost the only instances I have met with in this neighbourhood. In my article on the Otter I was unable to say with certainty the number of teats found in the female Otter. I have now on several occasions found it to be six. As to the number of young produced at a birth, two and three appear to be about equally frequent; in only one instance have I known four—that number was found in a nest in the middle of February, 1865. The heaviest Otter I have ever seen (a male) weighed 37 lbs., and measured only 48 inches in total length, whereas I have seen a male Otter measuring 53 inches which weiged only 27 lbs.; so much for condition. A very poor female which I saw on the 16th of the present month (March) measured 43 inches and weighed only 10 lbs. I have noticed in very young Otters that they differ almost as much in comparative weight and size; so that weight is certainly not a safe indication of the age of the little one; length would be much more reliable. But I should be very glad to hear that Mr. Cocks had mated his lonely females, and was likely to observe with certainty the period of gestation and progress of the young ones. The time of pairing in confinement I do not think would be of any value as an indication of what takes place in a state of nature.—T. Southwell (Norwich).

Rare Birds in the Humber District.—During the past autumn and winter I have noted the following uncommon birds in this district:—On the 6th September a rather rare wader was obtained at Spurn Point—namely, the Spotted Redshank. This example, now in the collection of Major Seddon, of Waltham Cross, is a female bird in immature plumage. Between the 21st and 27th September three Black-tailed Godwits, all females and immature, were obtained at Spurn. Also, in the same locality, a remarkably fine old male Velvet Scoter, shot October 18th. It is very curious how rarely we meet with the Velvet Scoter in any stage of plumage near our coast or within the estuary of the Humber. It is essentially a sea duck, and rarely occurs close in shore. It is far commoner at sea off the Norfolk coast than along the Lincolnshire or Yorkshire seaboard; in the former locality nearly every flock of the Common Scoter will contain one or more pairs of Velvet Scoters, readily distinguishable by the white speculum on the wing. North of the Wash it is quite a rare occurrence when at sea to come across any of these ducks. On January 21st I saw a Great Ash-coloured Shrike within a short distance of the town of Grimsby. I first noticed it perched on an upper twig in a quick-fence; on leaving this it fortunately flew in my direction, passing within twenty yards with an undulating jerky flight, much like a wagtail's; it was apparently a bird of the year. I followed it for some distance along a double post and rail fence, the shrike keeping about five and twenty yards ahead, flitting from post to post—but always in a very dodgy manner—on the off-side of the fence, and in each flight, short as they were, dropping near the ground and rising suddenly to the post-top: when perched the tail was never still for a moment. Mr. Bailey, of Flamborough, has informed me of a Goshawk in his possession, an old female, shot by the gamekeeper to the Rev. Lloyd Greame, of Sowerby Hall, Bridlington, about the 24th of January. Mr. Bailey says the bird measured four feet one inch from tip to tip of wing, and was two feet one inch in length: it was seen by the keeper to kill a full-grown rabbit and carry it twenty yards or more.—JOHN CORDEAUX (Great Cotes, Ulceby).

WHITE-TAILED EAGLE IN HEREFORDSHIRE.—On the 18th November, 1876, I was in Henry Shaw's shop in Shrewsbury, and found he had just commenced skinning a fine specimen of the White-tailed Eagle, which had been received that morning from Berrington, near Leominster, the beautiful seat of Lord Rodney. The bird had been trapped a day or two previously, and, having been caught by only one hind-toe and not in the least degree injured, it was a thousand pities it was destroyed. It was a female, probably of the second year, as although the plumage was very handsome, being a dark mottled brown, there was no indication of the "white tail." This eagle was a very powerfully made bird, full of flesh, very muscular, and altogether in high condition. As Berrington is situated nearly in the centre of Herefordshire, and as I believe the nearest sea coast is about eighty miles distant, it is very difficult to conjecture from what locality so remarkable a bird could have wandered.—JOHN ROCKE (Clungunford House, Shropshire).

PEREGRINE FALCONS NEAR WAREHAM.—A fine pair of Peregrine Falcons have been lately trapped near Wareham, one about the 26th February, and the other—of unusually light colouring about the head and neck—on March 9th or 10th. They are apparently birds of last year, in the characteristic plumage of the first year, with longitudinal markings down the breast. It has been asserted that certain strains of this falcon, from different districts, retain their first plumage for two years sometimes, or even more. I should be glad if any of your readers can substantiate this.—A. P. MORRES (Britford Vicarage, Salisbury).

ROUGH-LEGGED BUZZARDS NEAR TISBURY, WILTS.—In the last week of December four specimens of the Rough-legged Buzzard were trapped by the keeper in a large wood at Fonthill, near Tisbury, in this county. One, a male bird, was of a light colour; two others were females, and much darker. There was a fifth bird of the same species seen about the place at the time, but this fortunately escaped. The rough winds of the past winter would doubtless account in some measure for the unusual number of this species and that of the Short-horned Owl which have visited us this season.—A. P. MORRES.

ROUGH-LEGGED BUZZARDS IN EAST YORKSHIRE.—These birds appear to have been uncommonly numerous in different parts of the country during the past autumn and winter months, and this district has also been visited by them in some numbers. Four to my knowledge have fallen victims to the gun, and I have heard of others having been seen. The last obtained was a very fine old male, shot at Patrington on the 24th January last. This bird was very fat, and in its stomach was a quantity of fur and the remains of one or more field voles. A Rough-legged Buzzard frequented our low grounds all the winter, and was at length shot. It proved to be an immature female. The stomach contained mouse's fur, and the bird was very fat. This low-lying country has been inundated for many miles, with here and there little islands studded about, on which the rats, mice and moles were driven to take shelter, and on these there is little doubt the Buzzards fared sumptuously. I quite endorse what Mr. Sclater says about second-hand information. I have had so much of it, and found it so wholly unreliable, that in a very great majority of cases it certainly is not worth printing. The so-called "eagle" sent to Beverley has come under my observation, and Mr. Sclater is quite correct in his surmises. It is an immature Rough-legged Buzzard, and is at present alive and well.—F. BOYES (Beverley).

MERLINS IN KENT.—On February 4th I saw a magnificent old male Merlin here, with bright blue back and orange breast. Since that I have seen another blue male rather paler in colour, and a female. As mentioned in my note in February's 'Zoologist,' this is somewhat earlier than I usually see male Merlins here. As a general rule, females predominate in autumn and males in spring about here.—CLIFTON (Cobham Hall).

LATE ASSUMPTION OF ADULT PLUMAGE BY THE MALE KESTREL.—About the second week in January a male Kestrel was shot here, which was hardly distinguishable from an old female, except in slightly smaller size and a warmer tone of rufous on the back. The tail was slightly washed with blue, but not so much as in some old females. Even the upper tail-coverts were rufous, and the feathers on the nape were whitish, forming a rather merlin-like collar. I took it at first for a small female.—ID.

TENGMALM'S OWL IN ESSEX.—One day towards the end of January last some boys noticed a bird in a tree near the iron bridge in the Barking Road, Poplar. They frightened it out, and as the poor Owl was not used to flying by day it soon paid the penalty for its rashness in venturing out. It was brought to my office in the flesh, but as I was away the person who had it thought best to make a skin of it for me. It is a very nicely marked specimen of Tengmalm's Owl, but I am not able to record the sex. The majority of specimens of this Owl which have been obtained in Great Britain appear to have been killed in the winter months.—EDWARD BIDWELL (Richmond, S.W.)

EAGLE OWL IN YORKSHIRE.—My brother saw an Eagle Owl which was captured by two farm servants in July, 1876, on the edge of Rombald Moor, near Ilkley. I think Pennant mentions the occurrence of this species in this county.—E. P. BUTTERFIELD (Wilsden).

[It is Montagu who mentions the occurrence of the Eagle Owl in Yorkshire. The specimen recorded by Pennant, in his 'Caledonian Zoology,' p. 18, was killed in Fifeshire.—ED.]

SNOWY OWL IN THE LEWES.—About the end of November, 1876, I received a fine adult male Snowy Owl from the island of Lewes. A friend of mine who had the shootings of Bervase, in the northern portion of the island, had seen this bird on several occasions, but both he and his keeper failed to obtain it. When he returned south, word was left with the keeper, that if he could get it "clean-killed" and would send it to Shrewsbury, he knew a collector who would be glad of it. I was much pleased shortly afterwards to find that the bird had arrived in a most beautiful state of preservation, and was nearly as white a specimen as I have ever seen. These birds have been so numerous of late in "the North" that this additional capture is not very remarkable. Still, as I believe this is the first recorded instance of its occurring in the Lewes, a notice of it may be interesting.—JOHN ROCKE (Clungunford House, Shropshire).

ORNITHOLOGICAL NOTES FROM THE WEST OF ENGLAND.—Mr. Hayden, of Fordingbridge, in the New Forest, informs me that an example of the Red-legged Hobby was killed close to that place in December last. It is singular that several birds which are only summer visitants to the South of Europe should from time to time be obtained in this kingdom in late autumn or mid-winter. Another instance of the Red-legged Falcon's having been procured in England in the winter time is mentioned in Dr. Bullmore's 'Cornish Fauna.' This specimen was shot near Falmouth in the month of February. A Peregrine Falcon was killed at Bagborough during the severe north-westerly gale which swept across Taunton Dene on the night of the 19th February last. Many trees were blown over, and by the side of a fine elm was picked up the crushed body of an old tiercel which had been roosting in the tree, and had perished with it—a singular death for a noble Falcon. The first "cold snap" (as the Americans say) brought Hawfinches into this village; on most days I see one on my lawn feeding on the red berries which strew the ground under some whitethorns. The Acts for the Preservation of Birds include several which are only rare visitors to this country, and only to be distinguished by experienced ornithologists, which might justly be termed "fancy birds," while some which are most useful to the agriculturist have no protection, and are in consequence in great danger of extermination. There are no two more deserving members of the rural police than the White and Brown Owls: the foolish fashion of exhibiting the masks and wings of these birds in the form of hand-screens is leading to their constant persecution and slaughter, and in some parts of the country they are fast becoming scarce. A birdstuffer in Taunton informed me that on an average he mounted fifty Barn Owls and forty Brown Owls a year, and, as I have sometimes seen half-a-dozen fresh victims brought into him at once, I can well believe that these figures are not over-stated. There is another birdstuffer in the town who seems to do an equally large trade in mounting unfortunate owls. So keenly are they looked after that when a short time since a White Owl was so ill-advised as to show himself in the Priory Meadows five gunners watched patiently for him evening after evening until one succeeded in bringing him down. The natural result is an inconvenient increase of small vermin. One of the villagers here told me that last spring he trapped more than sixty field mice by one row of peas in his allotment, and that unless he had been thus vigilant in destroying these small depredators his crop would have been quite lost. Years ago he stated it would have been unusual to have trapped more than two or three. Surely it is time that something was done in the interest of poor gardeners to protect their best friends, the owls, from senseless slaughter.—MURRAY A. MATHEW (The Vicarage, Bishop's Lydeard).

PURPLE GALLINULE IN SOMERSETSHIRE.—The following are the particulars of the capture of a bird of this species, as sent me by Mr. Filleul, of Biddisham:—"A Purple Gallinule was caught in a ditch at Tarnock, in Badgworth parish, on August 25th, 1875. It is now in the possession of a farmer of the name of James Burrows, whose lads caught it. It was caught alive, and kept for a few days in a hamper. It died of starvation, I suppose, and was then stuffed. I have seen it twice: it is a very handsome bird, shaped like a Coot, but the legs are longer." I understand that another was seen at the same time.—ID.

SINGULAR ACCIDENT TO A KINGFISHER.—While Snipe-shooting one winter round Hickling Broad, in Norfolk, I noticed some small object splashing in the water at the side of a dyke, and on proceeding to the spot I discovered an unfortunate Kingfisher, which had come to grief in a very singular manner. The bird had evidently at some former time been struck by a shot which had passed through the upper mandible. This wound was quite healed up, but a small piece of the horny substance of the beak had been splintered, and into the crack produced by the fracture two or three of the fine fibres which form part of the flowers or seeds of the reed were so firmly fixed that the bird was held fast. It must have been flying up the dyke, and, brushing too closely to the reeds that grew on the banks, got caught in the manner described. The struggles of the captive had broken down the reed, which was lying flat on the water, except when lifted up by the victim in its vain attempts to escape. On being liberated it flew off, apparently none the worse for the mishap.—E. T. BOOTH (Brighton).

GOSHAWK AND OTHER BIRDS IN YORKSHIRE.—On the 30th October last I was at Filey, where Mr. Brown showed me a Long-tailed Drake in most perfect plumage, which had been shot while flying over the Brigg the previous week. During the present winter several other examples have been met with, but all females or immature birds. Both the Black-throated and Red-throated Divers have been very abundant off the Yorkshire coast. On January 29th I went over to Flamborough to see Mr. Bailey; he showed me a fine adult female Goshawk, just mounted, which had been killed at Sewerby on the 23rd. This bird had frequented the neighbourhood for some time, and was shot at near Flamborough on Christmas Day, but unsuccessfully; length 2 feet, expanse of wings 4 feet 1 inch; irides, brilliant orange. On February 8th I saw in Mr. Brown's shop, at Filey, an immature Hen Harrier, killed a few days before near the cliffs. Long-eared and Short-eared Owls have been very common this winter, and many, I am sorry to add, have been killed. On February 4th a Raven was seen by Mr. Roberts flying along shore to the southward of Scarborough; twenty-five years ago he can remember a pair breeding annually in the rocks near Scarborough Castle. In our immediate neighbourhood this winter rare birds have been "conspicuous by their absence."—JULIAN G. TUCK (Old Vicarage, Ebberston, York).

HAWKS IN SUFFOLK.—In the month of September, 1876, an adult male Merlin (*Falco æsalon*), in exquisite plumage, was shot at Westley, near Bury St. Edmunds, Suffolk. A Hobby (*Falco subbuteo*) was shot in the covers at Finborough Hall, near Stowmarket, Suffolk, the latter end of January, 1877, and another was killed in the same place some months previously, but whether they were male and female I have not been able to ascertain. One or two Rough-legged Buzzards (*Buteo lagopus*) were shot in the neighbourhood of Newmarket during the month of December, 1876, but whether on the Suffolk or Cambridgeshire side I am unable to say.—H. K. CREED (Chedburgh Rectory, Suffolk).

[The occurrence of the Hobby in this country in mid-winter is noteworthy, for this bird is a summer visitant, and generally leaves us about September, or at latest in October, just as the Merlin arrives to take its place for the winter.—ED.]

SCARCITY OF THE WOOD PIGEON AND INCREASE OF THE STOCK DOVE IN THE COUNTY DURHAM.—In answer to your editorial remark, and as an addenda to my note (page 55), I beg to say that Stock Doves are now quite common here. They could not have chosen a safer retreat than the Denes in this neighbourhood afford them. They almost invariably nest amongst the roots of the yew-trees overhanging the tops of the rocks, and are thus comparatively secure. I saw several yesterday, and also heard their grunting notes in different places, but not a Wood Pigeon was to be seen. Perhaps I ought also to have added that there were more Sparrowhawks found nesting in this locality last year than I have ever known; they may have scared the Wood Pigeons away, but they certainly killed but few; when they do kill them the act is easily traceable.—JOHN SCLATER (Castle Eden, Durham).

[The circumstance of Stock Dove frequenting and even breeding amongst rocks is, we believe, unusual, although not unnoticed. Some years ago the fact that the Stock Dove occasionally breeds in the rocks on the Dorsetshire coast was recorded in 'The Field,' 14th April, 1866, and quite recently a correspondent writing in the Natural History columns of that journal (3rd March, 1877), stated that he had observed Stock Doves congregating amongst rocks at Merthyr Tidfil. He shot two of them in order to identify the species.—ED.]

PASSENGER PIGEON IN YORKSHIRE.—In the last published part of the Nat. Hist. Transactions of Northumberland and Durham (vol. v., part iii.) Mr. John Hancock records the capture of a Passenger Pigeon in Yorkshire. At p. 337 he says:—"On the 13th October, 1876, I received a specimen of this North-American bird from the Dowager Marchioness of Normanby, who stated in her letter which accompanied the bird that 'it was shot here to day by Lord Harry Phipps.' The bird must therefore have been killed on the 12th, and as her ladyship's letter is headed 'Mulgrave Castle,' it is clear also that the bird was obtained at Mulgrave, the seat of the Marquis of Normanby." Mr. Hancock adds that "the quill-feathers in the wings are much worn and broken, and on the forehead above the bill they are apparently worn off to the skull, as though the bird had been trying to get out of a cage or some other enclosure; therefore I cannot come to any other conclusion than that this specimen, a female, had made its escape from confinement." It may be observed that the Passenger Pigeon has been previously recorded to have been met with in the British Islands on five different occasions as follows:—One, Monymeal, Fifeshire, December, 1825 (Fleming, Hist. Brit. An. p. 145); one near Royston, Hertfordshire, July, 1844 (Yarrell, Hist. Brit. Birds, vol. ii., p. 317); one near Tring, Hertfordshire (Yarrell, *op. cit.*); one near Tralee, 1848 (Thompson, Nat. Hist. Ireland, Birds, iii., p. 443); and one near Mellerstain, Berwickshire (Turnbull, Birds of East Lothian, p. 41). With regard to this last, however, it is stated that a gentleman in Berwickshire had turned out several Passenger Pigeons shortly before it was shot.—ED.

BLACK STORK IN OXFORDSHIRE.—A gentleman residing at Bicester has an immature example of this rare bird, and has very kindly collected for me a few particulars concerning its capture. It was shot on the 5th August, 1865, on Osmoor, a large tract of low-lying land some nine miles N.E. of Oxford, by F. Gorum, who is well known in the vicinity of Oxford as a good shot. From him it passed to its present possessor, who preserved it. The Stork was at first mistaken for a Heron.—C. M. PRIOR (Bedford).

WILD-FOWL IN BEDFORDSHIRE.—Wild Duck, Snipe, Golden Plover, and Lapwing, have been unusually plentiful in this county this winter. The last two species might be counted by thousands, and I saw over fifty ducks reposing on the floods near to the road. There were also occasionally a few gulls. Wherever a green patch appeared above the floods it was literally crowded with Plover: I repeatedly saw a Sparrowhawk, evidently a male from his small size, dash at them, but from their habit of rising from the ground and meeting him, I could not perceive that he was successful. Owing to the extensive floods very few of these birds have been shot.—ID.

VARIETIES OF THE SKY LARK.—With the exception of the House Sparrow I think the Sky Lark is more subject to abnormal variation of plumage than any other British bird. The commonest phase is buff, but I once bought a singular slate-coloured one in Leadenhall Market. Another curious Sky Lark in my collection was netted near Stockton-on-Tees by a birdcatcher, and it appears to me that at the time it was caught it was pied, and that a diet of hemp-seed afterwards has, in addition, operated on its plumage, and turned the portions which were brown, black, so that now it is black and white—a much greater anomaly than a brown and white one would be. At one time I considered this a unique specimen, but I believe others have occurred, and one similar one is described by Mr. Hele, as a great curiosity, at p. 95 of his 'Notes about Aldeburgh.'—J. H. GURNEY, JUN. (Northrepps Hall, Norwich).

WOODCOCKS FREQUENTING THE SEA-SHORE.—Mr. Roberts, of Scarborough, tells me that in the winter of 1863-4 Woodcocks frequented the harbour to dig for worms in the mud. As some of the birds were shot there was no mistake about the species.—ID.

WINTER VISITANTS TO THE ISLE OF WIGHT.—Mr. Smith, the Newport naturalist, informs me that he has lately received the following birds for preservation:—A Common Buzzard, shot in the parish of Shalfleet, on the 23rd December; an adult female, measuring twenty inches in length, and fifty in extent of wings. The stomach contained a vast number of earthworms, also a quantity of grass. I am reminded by Mr. Smith that a Common Buzzard was procured at the same date in 1873. A Spotted Crake was shot at Arreton. Two Gray Phalaropes were shot in December, one on the 4th, the other on the 23rd. This is a somewhat late date at which to find this migrant; in former years they have been generally met with early in the autumn. The Gray Phalarope is either more abundant than of yore, or our naturalists more observant, hardly a year passing without some appearing on our shores and inland pools. It seems somewhat strange to find Macgillivray remarking that only one individual—unmutilated—had come into his possession; and even Mr. Morris, in 1870, refers to the Gray Phalarope as a rare visitant, saying that one had been procured here and another there. A Fork-tailed Petrel was found on the 25th December at Alverston, near Sandown, lying dead in the mill-dam, uninjured, and in good condition. The tarsus of this specimen measures but one inch, and the bill three-quarters of an inch; the closed wing exceeds the tail by a quarter of an inch; rump white, exterior tail-feathers margined with the same, and the quill-coverts have a dusky gray tinge.—HENRY HADFIELD (Ventnor, Isle of Wight).

POMARINE SKUA IN MOUNT'S BAY, CORNWALL.—During the first week of March a specimen of this Skua, approaching to maturity, as indicated by the lower part of the breast and belly being white, was obtained in Mount's Bay. This bird at times is not uncommon with us, but it generally appears in its dark sooty plumage, with ferruginous edgings to the scapularies and dorsal feathers, indicating immaturity. There is nothing remarkable in the rest of the plumage of the present specimen, except that the whole of the upper parts are unusually dark, and there is no sign of the filamental yellow feathers on the sides of the neck, which I believe are found always in the mature-plumaged birds.—EDWARD HEARLE RODD (Penzance).

GANNETS OFF THE CORNISH COAST.—In our western seas there has been an unusual number of Gannets this winter, and they have extended in many instances inland, apparently in a state of destitution. This is probably owing to the disturbed state of the sea, arising from a succession of westerly winds, which has rippled the surface and prevented fish from being seen except on the very surface. Gannets not being submarine hunters have fallen short of food, as they had nothing to pounce upon. If I were inclined to collect a series of birds in different stages of plumage, from the immature to the adult state, I should have a good opportunity of doing so now, for I observed lots of specimens at Mr. Vingoe's laboratory just now in all stages of parti-coloured plumage.—ID.

ICELAND AND GLAUCOUS GULLS AT THE LAND'S END.—Early in March I had occasion to examine a stuffed specimen of what I have no doubt is the Iceland Gull, which had been recently killed somewhere in the Land's End waters; but at first sight on looking at the bird I was never more puzzled in determining whether it was the Glaucous or Iceland Gull. It is an unusually large specimen, and I suppose it is in fact a very fine male bird, but its general appearance gives one the idea of its being an under-sized Glaucous Gull. To give a notion of its size from dimensions I may state that I made the length from the carpal joint to the end of the wing (which exceeds the tail by two inches) eighteen inches, but perhaps Mr. Vingoe may be more correct in putting it at seventeen inches and a half. A specimen in the same state of plumage, obtained here some years since by the late Mr. D. W. Mitchell, measured fifteen inches and a half from the carpal joint to the end of the wing. Some of your readers might very properly remark that from my description this specimen might as well be a small Glaucous as a large Iceland Gull, but I think the length of the quill-feathers beyond the tail shows its character against the Glaucous Gull. It will, however, be necessary to be cautious in dealing with this point—*viz.*, the length of the quill-feathers of this bird, as mentioned by authors. The quill-feathers of the Glaucous Gull are spoken of by most of our authors as scarcely equalling the tail-feathers in length: this, however, is a mistake, for in my specimen, and in one in Mr. Vingoe's possession, the feathers exceed the tail, slightly certainly, but by an inch at least. In Mr. Gould's figure of the Glaucous Gull, in his 'Birds of Great Britain,' I see he makes the length of the quill-feathers exceed the tail, in accordance with the two specimens I have mentioned.—E. H. RODD (Penzance).

CURIOUS EFFECT OF THE RECENT FLOODS.—During the month of January last one or two Kingfishers were picked up dead in the water, close to the Vicarage, apparently from starvation, the flood rendering it impossible for them to find their usual sustenance. I may add that these birds have been unusually plentiful in the neighbourhood this winter, and very tame.—ARTHUR P. MORRES (Britford Vicarage, Salisbury).

KING DUCK IN ORKNEY.—On the 31st January last I was out shooting in the String of Shapinsha, and came across a solitary specimen of the King Duck (*Somateria spectabilis*); which I bagged. It was an adult male bird, and I have sent it to be preserved by Ward, of Vere Street, London. The man from whom we hired the boat, and who accompanied us, said that although he had been in the habit of shooting and fishing about the islands for years he had never seen one before.—R. P. HARPER (2, Royal Crescent, Scarborough).

THE "CURLEW" OF THE WILTSHIRE DOWNS.—With reference to the remarks which appeared in the January number of 'The Zoologist' on the supposed breeding of the Common Curlew (*Numenius arquata*) on the Wiltshire Downs, as mentioned in the Appendix to the 'Birds of Marlborough,' it may interest you to know that I have made some enquiries on the subject. Marsh, a labouring man, one of the two Marlborough men who took the eggs and captured an old Curlew, on being shown a stuffed Stone Curlew (*Œdicnemus crepitans*), immediately identified the bird which he had taken with that species, and when shown the head and wings of the Common Curlew said he had never seen a bird like that before. The only authority, therefore, for the breeding of the Common Curlew near Marlborough is now the list published some fifteen years ago in the 'Flora of Marlborough,' and as only one specimen of this bird has ever been recorded to have been taken near here, there can be little doubt that the species found nesting was the Stone Curlew, or Thick-knee.—T. Graham Balfour (Cotton House, Marlborough).

Pilot-fish and Gray Mullet.—On February 14th a Pilot-fish (*Gasterosteus ductor*) was taken in a herring-net off Plymouth, and on the 26th of that month an immense shoal of Gray Mullet was captured when the water was pumped out of the "graving" or dry dock of the Great Western Docks, Plymouth. This shoal consisted of many thousand fish, which were sold for the large sum of £215 for the Paris market. A large number of these fish measured nearly twenty inches in length, and weighed four or five pounds each, many of them much more.—John Gatcombe (8, Lower Durnford Street, Stonehouse, Plymouth).

Angular Crab near Falmouth.—I have lately received a specimen of the Angular Crab (*Gonoplax angulata*) captured in Veryan Bay, near Falmouth.—Thomas Cornish (Penzance).

[This Crab has been frequently taken on the South coast of England and on the Irish coast, but does not appear to have been met with on the eastern seaboard or in Scotland.—Ed.]

Unusual Hiding-place for Frogs.—One of my farmers, who is very observant in matters of Natural History, told me that about a month ago, on taking in a straw-rick, he had found a party of five or six frogs all comfortably nestled together on the very apex of the rick, which was some fifteen or sixteen feet high, and that he had found them in the same kind of place more than once. This says a good deal for the frog's power of climbing, for the straw having been ricked as it came only from the threshing machine, they could not have been carried up in it inadvertently. I did not know before they had such a claim to be ranked amongst the Scansores.—Arthur P. Morres (Britford Vicarage, Salisbury).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Linnean Society of London.

February 18, 1877.—Prof. Allman, F.R.S., President, in the chair.

Messrs. William Burns, E. T. Gardner, J. W. S. Micklejohn, Professor W. W. Harrington of Michigan, U.S., the Rev. John Stubbs, and Sir Charles W. Strickland, Bart., were elected Fellows at this meeting.

Mr. Arthur Lister exhibited under the microscope a most interesting example of the plasmodium of one of the lowly-organized *Myxomycetæ*. This common mass of protoplasm well illustrated the peculiar amœboid movements, and the object gave rise to an animated conversational discussion as to its oft-contested animal or vegetable nature. Professor Haeckel evades this knotty point by provisionally grouping it along with certain other doubtful organisms in his kingdom *Prostita*.

The Secretary read a short communication—"Note on a new example of the Phyllodocidæ (*Anaitis rosea*)," by Dr. W. C. McIntosh. This marine worm was obtained at St. Andrew's last autumn, at the margin of low water, and sunk several inches in the fine sand. In the genus *Anaitis* the buccal segment carries the first three pairs of tentacular cirri, the fourth being on the segment behind. *A. rosea* measures about one inch and a half long, the body being relatively broad to its length; the snout is blunt, and the eyes small and circular. The head and tentacles are pale, but in front of the eyes, and partly along segments behind, are roseate bands and speckles, continuing backwards in a bright yellow band, thus resembling certain of the Nemerteans.

The Secretary likewise read a paper "On certain New Forms of *Actinaria* dredged in the Deep Sea from on board H.M.S. 'Challenger'; with a Description also of certain Pelagic Surface-swimming Species," by H. N. Moseley, M.A., late Naturalist to the Government Circumnavigating Expedition. A small part only of what were obtained are accounted for in the present paper, occasional rough weather and other circumstances often preventing immediate attention and descriptions of the animals while fresh. Those now delineated and described are as follows:—

Family *Actiniidæ*. Subfam. *Minyadinæ*—(1) *Nautactis purpureus* n. sp.; (2) Larval minyad; (3) *Oceanactis rhododactylis*, n. gen. Subfam. *Actininæ*—(1) *Actinia abyssicola*, n. sp.; (2) *A. gelatinosa*; (3) *Edwardsia coriacea*, n. sp.; (4) *Corallimorphus profundus*, n. gen.; (5) *C. rigidus*, n. sp.

Family *Cerianthidæ*—(1) *Cerianthus bathymetricus*, n. sp.

The occurrence in the deep sea of representatives of shallow water forms of sea anemones is of high interest. For example, the above species of *Edwardsia* from 600 fathoms has undergone but a trifling modification from the littoral form. The *Cerianthus* from 2750 is dwarfed, but uncommonly like its shore brethren; moreover, under the full glare of the tropical sun in shallow water at the Philippines, one kind is found, another species of the same genus existing at three miles depth, where solar rays do not penetrate, and the water is at freezing-point. The fact of the deep sea anemones retaining vivid colouring in their dark watery abode is a point of special value connected with other generalizations. The genus *Corallimorphus* possesses interest as being a near ally to certain of the simple discoid corals, and it has besides the largest nematocysts yet recorded.

An extract from a letter from Mr. R. D. Fitzgerald, of Sydney, New South Wales, relative to the Marsupial Pouch, was briefly adverted to.

Two botanical papers were read;—"On the Rootstock of *Marattia fraxinea*, Sm.," by John Buchanan; and "On Algæ collected by Dr. I. Bailey Balfour at Rodriguez during the Transit of Venus Expedition, 1874," by Professor Dickie.

March 1, 1877.—Prof. ALLMAN, F.R.S., President, in the chair.

Mr. Robert Gillies (of Dunedin, Otago, New Zealand), Mr. Herbert Goss (The Avenue, Surbiton), Dr. Albert Günther, F.R.S. (British Museum), and Mr. Matthew Moggridge (8, Bira Gardens, South Kensington) were elected Fellows; and Mr. W. C. Cooke (2, Grosvenor Villas, Junction Road, Holloway, N.)—well known for his researches on Fungi—was elected an Associate of the Society.

The only zoological paper read at this meeting was one by Mr. Edgar A. Smith, *viz.*, "Description of a new Form of *Ophiuridæ*." The specimen in question was collected by the late Mr. Cuming in the Philippines between thirty and forty years ago, and was deposited in the British Museum, where its peculiarities seemed to have escaped notice until recently, when comparison with other later additions from a neighbouring locality directed attention to it. This remarkable species partakes more of the character of the genus *Ophiomastix* than of any other. The soft skin covered with minute scales, the mouth-organs, and the character of the arm-plates and upper series of spines agree precisely with those of that genus; but the absence of tentacle-scales is perhaps sufficient to separate it subgenerically. The author has therefore named it *Acantharachna mirabilis*, the subgeneric name being suggested by its fancied resemblance to a thorny-legged spider.

A highly important communication, "On the Flora of Morocco," was read by Mr. John Ball, F.R.S. (Pres. Alpine Club), special attention being called to the fact that, although but a few days' sail from London, the fauna and flora of that country are comparatively unknown to Europeans. Much remains to be done, but considerable difficulty attends exploration, especially in the mountainous districts, from the strong opposition of the inhabitants, descendants of the once warlike and fierce Berbers.

Mr. J. G. Baker gave the gist of his researches "On the Angolan *Liliaceæ*," as represented in the valuable herbarium of the late Dr. Welwitsch, the proportion of new species being very great; Mr. W. P. Hiern exhibited and made remarks on the embryo of *Embryopteris*, Gaert.; and Dr. Maxwell Masters brought before the meeting a series of specimens illustrative of what is commonly known as "burrs" or "witch-knots." These examples were collected by Mr. Webster, gardener to the Duke of Richmond and Gordon, from the neighbourhood of Banff Castle; and their nature and cause of production formed the subject of an interesting discussion.

March 15, 1877.—Prof. ALLMAN, F.R.S., President, in the chair.

The Rev. R. Gardner Smith, of Manningham, Bradford, and Mr. Alexander Young Stewart, Superintendent of the Apothecaries' Hall, were elected Fellows of the Society.

The Secretary read a paper forwarded by the Rev. Thomas Powell, missionary, resident in the Navigator's Islands, "On the Poisoned Spears and Arrows of the Samoan Islanders." The attention of the author had been called to this subject by the death of the late Commander Goodenough, R.N., said to have been caused by one of these weapons. His chief information has been derived from the son of a native chief. These arrows, it is said, are pointed with human bones, and in some instances with the spines of a large species of *Echinus*. The gummy product of several trees is used, and, besides being dipped in this, there is added a substance from wasp's nests and putrid liquid of the sea-cucumber (*Holothuria*). A kind of kiln is then prepared where the arrows are smoked, afterwards inserted into the dried flower of a species of *Zacca*, to prevent humidity, and tied up in bundles ready for use. Mr. Powell then noted the effects of the poison on the human system and the reputed means of cure.

Dr. A. Günther gave a "Notice of two large Extinct Lizards formerly inhabiting the Mascarene Islands." The fragmentary materials yielding evidence of these creatures had partly been obtained by Mr. Edward Newton, already well known for his acquaintance with the extinct fauna of the Mascarenes, and partly by Mr. H. H. Slater, one of the naturalists accompanying the Transit of Venus Expedition. The bones of one lizard must have been that of an animal above a foot long, not including the tail. As far as can be made out its nearest congeners were the *Zonuridæ* and *Scincidæ*, but nevertheless so far characteristically different as to be considered worthy of generic distinction, the name *Didosaurus mauritianus* being given it. The remains of another form from Rodriguez point to its being closely allied to the Geckos, although larger than *G. verus*: the name *G. Newtonii* has been assigned to it.

The second part of "Contributions to the Ornithology of New Guinea," by Mr. R. Bowdler Sharpe, was, in his absence, read by Mr. Howard Saunders. This paper contained an account of a collection of birds formed by Dr. James, a young and enthusiastic naturalist who was unfortunately murdered by the natives during an expedition to one of the islands in Hall's Sound, whither he had gone to collect Birds of Paradise. He collected in Yule Island and on the opposite coast of South-Eastern New Guinea. The collection contains fifty-three species, of which three appear to be new to science. The great bulk of the birds obtained were well-known Australian or Aru Island forms; and thus it becomes evident that the south-eastern corner of New Guinea cannot compare with the northern portion of the island as regards the species exclusively indigenous to the country. The new species are *Melidora collaris*, *Thomygama Jamesii*, and a long-tailed Kingfisher (*Tanysiptera microrhyncha*). The most interesting addition, however, is that of *Machaeramphus alcinus*, a night-flying black Kite, at present only known from the peninsula of Malacca and Southern Tenasserim, to which localities it was hitherto believed to be peculiar. As yet only four specimens of this rare bird of prey are known to exist, *viz.*, the type in the Leyden Museum, one in Mr. Hume's collection in India, one in the possession of the Marquis of Tweeddale, and one in the British Museum, presented last year by Captain Stackhouse Pinwell.

ZOOLOGICAL SOCIETY OF LONDON.

February 20, 1877.—Prof. FLOWER, F.R.S., Vice-President, in the chair.

A communication was read from Professor Owen, C.B., containing some additional evidence recently obtained of the former existence in South Australia of extinct birds allied to the genus *Dromornis*.

Mr. Osbert Salvin exhibited a series of drawings made during Hunter's voyage to Australia in 1788—92, wherein Duke of York Island as it then existed was depicted, together with various objects of Natural History, and offered some remarks on the geographical position and climate of this island, by way of preface to a series of papers by different authors on a collection of mammals, birds, reptiles, fishes, and insects sent home by the Rev. George Brown from the island in question and the neighbouring parts of New Ireland and New Britain.

Mr. Sclater read a paper on the birds in this collection, and described eleven species as new to Science, amongst which were a new Kingfisher, proposed to be called *Tanysiptera nigriceps*, and a new Pigeon, to which the name *Macropygia Browni* was assigned.

Dr. G. E. Dobson enumerated the Bats collected, amongst which four were considered to belong to undescribed species, and one of these to a new genus of the frugivorous Bats, proposed to be called *Melonycteris*.

Mr. Edward R. Alston dealt with the Rodents and Marsupials in this collection, and pointed out that the species, six in number, were either identical with New Guinea forms or nearly allied. For three new species the names of *Mus Browni*, *Uromys rufescens*, and *Macropus lugens* were proposed.

Messrs. O. Salvin and F. Du Cane Godman described the Lepidoptera, and found that the series of butterflies contained twenty-six genera and forty species, while in that of the moths eleven genera were represented by fourteen species.

Mr. E. J. Miers enumerated the Crustacea, and stated that the collection, with one exception (*Lysiosquilla arenaria*), belonged to the Decapoda, and contained in all forty-four specimens representing sixteen species. Although none of the species were new to Science, several were interesting and little-known forms.

Dr. A. Günther read a paper on the Reptiles and Fishes in this collection. Of nine lizards, one was described as new, and of eleven snakes three were considered to be hitherto unknown. Amongst the latter was a new genus and species of *Eryadæ*, proposed to be called *Erabophis asper*.

Mr. H. W. Bates gave an account of the Coleoptera collected, and remarked that the collection comprised forty-four species, and contained some of the finest species of the New Guinea fauna. Amongst these were many examples of a new Longicorn, proposed to be called *Batocera Browni*, after its discoverer.

March 6, 1877.—Dr. E. HAMILTON, Vice President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of February, and called particular attention to a Mexican Eared Owl (*Asio mexicanus*), purchased of a dealer in Liverpool, and said to have been received from Para, being the first example of this very well-marked species of Eared Owl which had been received alive, and a Rhea, purchased along with the above-mentioned Owl, which appeared to belong to the species distinguished in 1860 as *Rhea macrorhyncha* (Trans. Zool. Soc. iv., p. 356, pl. lxix.), from an example then living in the Society's Gardens.

Mr. E. W. H. Holdsworth exhibited and made remarks on a rare bird received from Ceylon, *Geocichla Layardi*.

Professor Owen communicated some notes made by Mr. G. F. Bennett, while exploring the burrows of the *Ornithorhynchus paradoxus*, in Queensland, with comments on them.

A communication was read from Lieut-Col. R. H. Beddome, containing the descriptions of three new snakes of the family *Uropeltidæ*, from Southern India.

Mr. A. G. Butler read the descriptions of some new species of Heterocerous Lepidoptera in the collection of the British Museum, from Madagascar and Borneo. Amongst the latter was the type of a new genus, proposed to be called *Mimeuplœa*.

Mr. G. French Angas read a paper in which he gave descriptions of a new species of *Bulimus* from Western Australia, and a *Paludinella* from Lake Eyre, South Australia; these he proposed to call respectively *Bulimus Ponsonbyi* and *Paludinella Gilesi*.

A second paper by Mr. Angas contained the descriptions of one genus and twenty-five species of marine shells from New South Wales.

Mr. Angas also read a further list of additional species of marine Mollusca to be included in the fauna of Port Jackson and the adjacent coasts of New South Wales, with remarks on their exact localities, &c., thus bringing up the number of species now ascertained to inhabit Port Jackson and the adjoining shores to a gross total of 693.

Mr. Phineas S. Abraham read a paper containing a revision of the Anthobranchiate Nudibranchiate Mollusca. The paper comprised a general and historical introduction to this group of Nudibranchs, *i. e.*, those which bear the branchiæ upon the dorsal surface, more or less surrounding the arms, and allusion was made to all the observations which had been made upon these animals. The second part consisted of definitions of the larger divisions and of the genera, with the enumeration, synonyms, and habitats, as far as possible, of every species hitherto recorded. In the last general list, *viz.*, that by H. and A. Adams, but 163 forms were mentioned; this list included 457. The third part contained descriptions of forty-one hitherto undescribed species belonging to the genera *Doris*, *Chromodoris*, *Hexabranchus*, *Acanthodoris*, and *Doridopsis*.

A communication was read from the Count Salvadori, containing notes on some birds mentioned by Dr. Cabanis and Mr. Reichenow as collected in Papuasia and in the Moluccas during the voyage of the 'Gazelle.'

March 20, 1877.—Dr. E. HAMILTON, Vice-President, in the chair.

Mr. Sclater called the attention of the meeting to an article in 'The Oriental Sporting Magazine' for May, 1876, in which it appeared that a two-horned Rhinoceros had been killed in February, 1876, at a place some twenty miles south of Comillah, in Tipperah. Mr. Sclater said that this was the third recorded occurrence of a two-horned Rhinoceros north of the Bay of Bengal.

Mr. Sclater also called attention to the fact that Mr. W. Jamrach had just imported a young living specimen of the Rhinoceros of the Bengal Sunderbunds, which was either *Rhinoceros sondaicus* or a very closely-allied form.

Mr. Sclater exhibited a small living Amphisbænian (*Blanus cinereus*), which had been accidentally brought to England in the roots of a hot-house plant from Port St. Mary, Spain, and was found at Clapham.

Messrs. Charles G. Danford and Edward R. Alston read a paper on the Mammals of Asia Minor, based principally on collections made by the former in that country. The list included one species of Bat, two of Insectivores, twenty of Carnivores, seven of Ungulates, and fourteen of Rodents. *Spermophilus xanthoprymnus*, Benn., was re-described, and the name *Mus mystacinus* was proposed for a new species of Field Mouse.

Mr. A. G. Butler read a paper on the Myriopoda obtained by the Rev. G. Brown in Duke of York Island. The species sent home were two in number, both of them allied to but distinct from previously described species. Mr. Butler proposed to designate them as *Heterostoma Brownii* and *Spirobolus cinctifes*.

A commuication was read from the Rev. O. P. Cambridge, in which he gave the description of some Spiders collected by the Rev. G. Brown in Duke of York Island, New Britain, and New Ireland. Two of these appeared to be undescribed, and were named *Argiope Brownii* and *Sarotes vulpinus*.

Prof. A. H. Garrod read a paper containing notes on the Anatomy of the Musk Deer (*Moschus moschiferus*).

A communication was read from Mr. Edward Bartlett, containing remarks on the affinities of *Mesites*, a rare Madagascan bird, and the position which it should occupy in a natural classification. From an examination of the structure of the feathers, Mr. Bartlett had come to the conclusion that *Mesites* was an aberrant form of the Ardeine group.

Dr. Günther read a paper containing an account of the Fishes collected by Capt. Feilden during the recent Arctic Expedition. Amongst them were several of great interest, especially a new species of Charr, for which the name *Salmo arcturus* was proposed. This Charr was discovered in fresh-water lakes of Grinnell Land, and was stated to be the most northern fresh-water fish known to exist.

Mr. Edward Newton exhibited and read a paper on a collection of Birds made in the island of Anjuan or Johanna, one of the Cormoro group, by Mr. Bewsher, of Mauritius, whereby the number of species known to have occurred in that island was raised to thirty-five, of which fourteen were first observed there by that gentleman. Five of them—namely, *Zosterops Anjuanensis*, *Tchitrea vulpina*, *Ellisia longicaudata*, *Turdus Bewsheri*, and *Turtur comorensis*—were described as new.—*P. L. Sclater.*

ENTOMOLOGICAL SOCIETY OF LONDON.

March 7, 1877.—J. W. DUNNING, Esq., M.A., F.L.S., Vice-President, in the chair.

Exhibitions, &c.

Mr. Douglas exhibited a specimen of the Longicorn, *Monohammus sutor*, brought to him alive, having been captured in a garden in the Camden Road. Also a melanic variety of *Orthosia suspecta*, taken at Dunkeld.

Mr. Hudd exhibited varieties of British Lepidoptera taken near Bristol and in South Wales. Amongst them were *Sphinx ligustri*, *Lycæna Alexis*, and *Boarmia repandata*, the latter a black variety.

Mr. Champion exhibited specimens of *Cardiophorus rufipes*, a species new to Britain, taken by Mr. J. Dunsmore near Paisley; also a British example of *Aphodius scrofa*, from the collection of Mr. Dunsmore, who unfortunately had no note of its locality.

The Secretary exhibited a specimen of an Isopod Crustacean, which had been forwarded to him by Mr. J. M. Wills, Surgeon S.S. 'City of Canterbury,' who stated that it was found occasionally parasitic on the flying fish, and generally close to the pectoral fins.

Mr. Douglas read the following extract from a letter received from Dr. Sahlberg from Helsingfors:—

"As you have already heard, I went on an entomological excursion to Yenisei. My plan was to meet Professor Nordenskjöld at the mouth of the river, and to return per steamer over the Kara Sea. I did not succeed, and therefore had to travel back through Siberia; still I have brought a mass of insects with me from the extreme north of Siberia, especially Coleoptera and Hemiptera, and now I am busy getting them into order. The insect fauna of Arctic Siberia agrees with that of Lapland, and I had the pleasure to find several species which I had formerly discovered in the north of my own country; for example, among Hemiptera, *Platypsallus acanthioides* and *Bathysmatophorus Reuteri*, the last being the most frequent of the *Cicadaria* in the district. In the neighbourhood of the River Yenisei, in places which are yearly flooded there were to be found many species strange to Europe, but not very many new.

"I have just looked through my Siberian collection of Hemiptera-Heteroptera, and as most of these were collected in the extreme north, the lot is rather poor, and consists of less than one hundred species, of which fourteen were new—viz., one *Aradus*, one *Calocoris*, two *Orthotylus*, one *Orthops*, one *Pachytoma*, one *Anthocoris*, one *Acompocoris*, five *Salda*, one *Corixa*. I am interested most in the *Salda* species, which were large and fine, and discovered in the extreme North (69°—70° 20′), in Tundra territory (*extra limites arborum*).

"I have just received the commission from the Nordenskjöld Yenisei Expedition (which consists of four naturalists, amongst whom is Philip Trybom, an entomologist), to work at the collection of Coleoptera and Hemiptera, which, however, is still in Siberia. I shall therefore not publish anything until I have looked through it, although I have the descriptions of the new species ready. Pending the appearance of Fieber's 'European Cicadaria,' I shall begin the Coleoptera."

Paper read.

The Secretary read a paper by Mr. W. L. Distant, "On the Geographical Distribution of *Danais archippus*." The author remarked on the migration of the butterfly from North America (its original home) eastward to Europe and the Azores and westward to the South Sea Islands and Australia, and attributed the "means of dispersal" to "winds, currents, and the agency of man." After the reading of the paper a discussion ensued, in which considerable doubt was expressed as to the probability of insects being conveyed on floating timber by the agency of the Gulf Stream or other currents.—*F. G.*